



'Winterization' for GM Locomotives . . . Page 29

RAILWAY

LOCOMOTIVES AND CARS

A SIMMONS BOARDMAN TIME-SAVER PUBLICATION

OCTOBER 1959

Report: 1959 Coordinated Meetings and Exhibits . . . Pages 5 and 44



CLASS
RF-333

Friction
Draft Gear



A super-capacity gear that has been service-tested and has **UNLIMITED APPROVAL** FOR APPLICATION to freight cars.

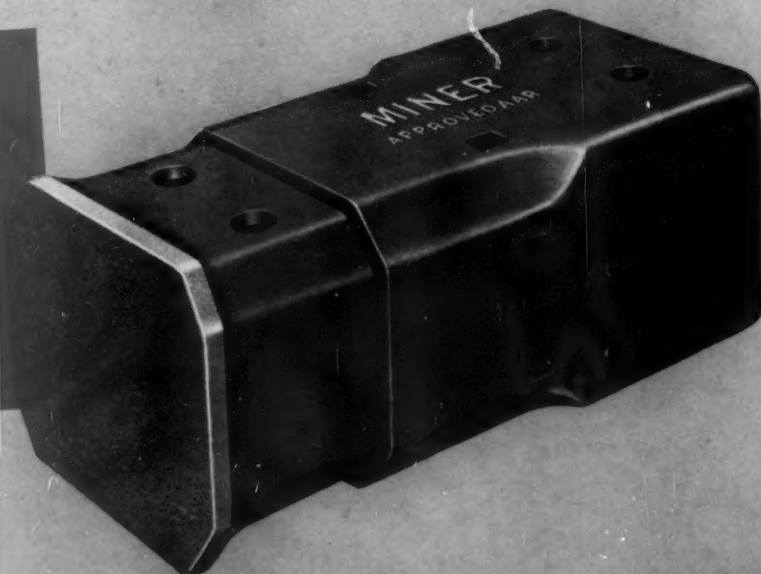
W. H. MINER, INC. CHICAGO

QUALITY

The Miner Class FR-19 Rubber Draft Gear is highly efficient, providing **FULL-TIME PROTECTION** to cars and lading. Self-contained, and no follower plates needed.

CLASS
FR-19

Rubber
Draft Gear

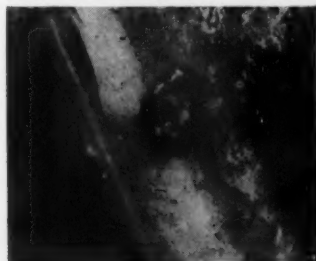




We look inside your commutator at National

...The Specialists in electric coils/repair service

AND HERE'S WHAT WE OFTEN FIND!



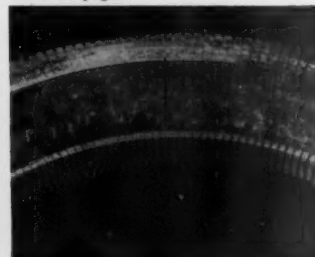
Enlarged view of a dielectric puncture of a mica vee ring at the lower end of the copper bar. This is an example of interior commutator faults which may be present though exterior appears excellent.



The bar which projects above those adjacent has been locally overheated under a brush and softened.



Shifted or squirted mica at the apex of the 3° and 30° cone surfaces of a mica vee ring. The black lines on the 3° surface were made by bar-to-bar voltage breakdown creepage.



A mica segment on the front end of the commutator has started to work out radially and will eventually result in a bar-to-bar short circuit.

When you send D-C machines to National for rewinding or rebuilding, the commutator gets a close inspection and test. But we've found from experience that a commutator that looks excellent on the surface may be in deep trouble inside... with mica cooked, varnish burned, loose copper, or imminent short circuits.

So when we are suspicious of the commutator we remove and open it for a close interior inspection. It's another added assurance that machines rebuilt by National will give you long, dependable service.

For more information, call National's Columbus plant... HUDSON 8-1151. Or call the nearest National field engineer.

National Electric Coil

DIVISION OF MCGRAW-EDISON COMPANY

COLUMBUS 16, OHIO

ELECTRICAL ENGINEERS • MANUFACTURERS OF ELECTRICAL COILS • INSULATION, LIFTING MAGNETS • REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

RAILWAY LOCOMOTIVES AND CARS • OCTOBER, 1959



TWIN FRICTION ACTION

means

REDUCED DAMAGE CLAIMS

Two "shock-stopping"

Friction clutch mechanisms
give Extra Measure of

Protection to Lading...

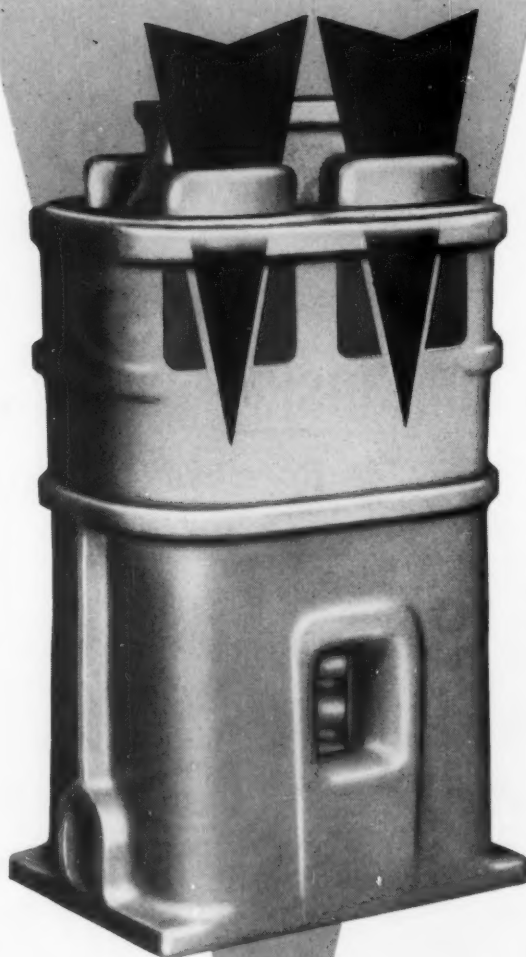
There's a good reason for it... Exclusive Peerless Twin Friction clutch mechanisms combined with 4 powerful springs, reduce damage claims by *more effectively absorbing shocks—more efficiently dissipating impact energy*... Lower transmittal ratio keeps lading protected from dangerous impact shocks... Chances of jamming due to severe impact are greatly reduced because of independent nest operation—You get an *Extra Measure of Protection* that means reduced damage claims.

Inspection of every Peerless component before assembly and complete testing after assembly assures consistent dependability. Write for the complete Peerless TWIN FRICTION ACTION story—Ask for Bulletin T-1.

PEERLESS EQUIPMENT

Division of Poor & Co.

332 South Michigan Avenue • Chicago 4, Illinois



T-1 FRICTION DRAFT GEAR
PEERLESS

LOCO- MOTIVES AND CARS

The Oldest Trade Paper
In the United States

October 1959—Vol. 133, No. 10

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REPORT FOR OCTOBER



A. M. Malmgren
Air Brake



J. F. McMullen
CDOA



W. E. Lehr
LMOA



J. S. Swan
RF&OA

Newly elected presidents of Coordinated Mechanical Associations

Dates for 1960 Meetings Are Announced

Next year's meetings of the Coordinated Mechanical Associations will be held in Chicago from Monday through Wednesday, September 12 to 14. This was announced on September 23 at the closing sessions of the 1959 meetings of the four groups which make up Coordinated.

At the annual meetings of the individual associations the following presidents were elected for the coming year: Air Brake Association — A. M. Malmgren, general diesel and air brake supervisor, Frisco; Car Department Officers Association — J. F. McMullen, superintendent car department, Erie; Locomotive Maintenance Officers Association—W. E. Lehr, superintendent motive power, Lehigh Valley, and Railway Fuel and Operating Officers Association—J. S. Swan, superintendent motive power operations, Louisville & Nashville.

At the annual meeting of the Allied Rail-

way Supply Association, H. C. Hallberg, president of Waugh Equipment Co., became the new ARSA president. Only the Committee of the Coordinated Associations does not hold a business meeting during the annual convention; it will be held in November.

Registrations for the 1959 meetings totalled 4,202 and were as follows:

Air Brake	210
Car Department Officers	489
Locomotive Maintenance Officers	685
Railway Fuel and Operating Officers	154
Allied Railway Supply Assn.	1,773
Ladies	891

An estimated 1,000 other railroaders and shippers attended the Allied track exhibit.

(Turn to page 7)

TIME SAVING IDEAS FOR MOTOR POWER AND C

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ELECTRICAL

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Brushes fouled traction motors



MAINTENANCE GOBBLED PROFITS

NATIONAL entered the scene!



FLOYD ANDERSON

Twenty-six of this road's diesel-electric units were in continual trouble," says "National" Carbon Brush Man, Floyd Anderson. "The reason," Floyd continues, "was bar burning and brush breakage on traction motors."

Floyd studied operating conditions on this road

and recommended "National" grade AZY brushes. Bar burning and brush breakage stopped at once, thus extending profitable service between rebuilds.

There's expert "National" brush service within easy phoning distance of every railroad in the country. Take advantage of it. Call your "National" office locally. Or write to National Carbon Company, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

"National", "N" and Shield Device, and "Union Carbide" are registered trade-marks of Union Carbide Corporation

NATIONAL CARBON COMPANY • Division of Union Carbide Corporation • 30 East 42nd Street, New York 17, N. Y.

OFFICES: Atlanta, Chicago, Dallas, Houston, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco • **CANADA:** Union Carbide Canada Limited, Toronto



Report—

(Continued from page 5)

AAR Discourages Use of Brilliant Asbestos CP

The Mechanical Division has advised member roads and private car owners relative to the use of "Brilliant Asbestos CP" to stop lading leaks in tanks of tank cars. It is claimed that by placing six or eight ounces of this material in the lading, it will find its way to the leak and stop it. Investigation by the AAR Committees on Tank Cars and Bureau of Explosives has developed the following information:

1. If the asbestos is placed in a tank car containing higher concentrations of hydrogen peroxide, a violent reaction would occur which might result in injury or death to the person placing it in car.

2. Materials such as hydrofluoric acid or liquid caustic soda would dissolve or decompose the asbestos, contaminating the lading.

3. Addition of asbestos to some of the newly developed chemicals, chemical compounds and mixtures would possibly tend to increase the rate of polymerization or otherwise render the chemicals so unstable as to cause a dangerous reaction.

4. Withdrawing some of the contents of the car, dissolving the asbestos and pouring the mixture back would be an extremely dangerous procedure. It is quite possible the asbestos would float and could not be mixed in by dumping it in on top of the contents.

5. In case of the older riveted type tank cars, the asbestos could get into the seams where it could not be readily removed and might hinder proper repairs. Interference might be had with provisions of Section b of Rule 2 unless cases of this nature were closely policed.

It is the opinion of interested committees of the Mechanical Division that the use of this method of temporary repairs should be discouraged. If rare and exceptional cases should develop where the carrier has to use this method, the final decision as to its use should be left jointly to the shipper and the AAR Bureau of Explosives rather than railroad personnel regardless of the type of lading involved.

HOT BOX STATISTICS

Year	Cars set off between terminals with hot boxes		Miles per car set off
	System	Foreign	
1954	53,785	75,058	247,932
1955	51,526	90,525	242,233
1956	56,239	113,047	209,479
1957	65,146	121,890	182,435
1958	60,112	96,358	200,417
Year			
1959			
Jan.	3,477	5,980	275,112
Feb.	3,547	6,802	235,057
March	3,364	6,705	275,160
April	3,836	7,383	243,032
May	5,113	10,756	181,319
June	6,262	13,907	138,002

Orders and Inquiries for New Equipment

Placed Since the Closing of the September Issue

Electric Locomotive Order

Road and builder	No. of Units	Horsepower	Detail
PENNSYLVANIA: General Electric	66	4,400	Rectifier type, similar to those built by GE for Virginian. To be leased. Approx. cost, \$32,000,000. To replace 90 25-yr old electric locomotives used in freight service. For delivery over 3-yr period.

Freight-Car Orders

Road and builder	No. of cars	Type of car	Detail
CHESAPEAKE & OHIO: ACF Industries	100	Flat	200 cars to be 85-ft, 70-ton, Delivery expected early in 1960.
Pullman-Standard	100	Flat	
MISSOURI PACIFIC: General American	50	Covered hoppers	70-ton. For October delivery.
Company shops	850	Box	50-ton. 250 with double doors.
	50	Box	70-ton, with cushion underframes, and DF loaders.
	200	Box	50-ton, with DF loaders. 100 to have double doors.
	100	Covered hoppers	70-ton.
	50	Covered gondolas	70-ton. Total 1,300 cars to have roller bearings.
NEW HAVEN: Bethlehem Steel	15	Covered gondola	70-ton, 52 ft 6 in., equipped with Standard Ry. Equip. 3-piece removable roofs and Evans DF loaders. Cost, over \$200,000.
NEW YORK CENTRAL: Pullman-Standard	300	Flat	70-ton. 100 for P&LE. Delivery scheduled to begin in December.
NORTHERN PACIFIC: General American	25	Piggyback flat	85-ft Clejan. Cost, approx. \$350,000. For first quarter delivery 1960.
WESTERN MARYLAND: Bethlehem Steel	400	Hoppers	70-ton. Approx. cost, \$4,440,000. Delivery to start in April 1960.

Passenger-Car Orders

Road and builder	No. of cars	Type of car	Detail
NEW YORK CITY TRANSIT AUTHORITY: St. Louis Car	230	MU	For BMT Division. Cost, \$27,446,950. Deliveries to begin in May at rate of 20 per month. Units to operate in semi-permanently coupled pairs. Each unit of a pair to have only one cab, with motor generator (auxiliary) for each pair mounted in one unit. Air compressor on second unit to serve brakes on both units. Also, one unit will carry batteries for each pair. Each unit to be 600 lb lighter than conventional cars.

Notes and Inquiries

Baltimore & Ohio, 100 of 500 box cars ordered from company shops (RL&C, September 1959, p 10) to have Buffalo Brake Beam's Brake X. 100 to be equipped with aluminum interior linings—fifty sets of new tongue-and-groove design to be supplied by Aluminum Co. of America and 50 sets of Inner Liners to be supplied by Reynolds Metals Co.

New York City Transit Authority has announced plans for a \$260-million program to retire from service 2,750 old subway cars and rehabilitate others. Board of Estimate being asked for \$65,285,850 for this purpose in 1960, and Authority would like to have \$195 million more in ensuing five years. Meanwhile, rehabilitation has begun on 200 obsolete subway cars on the BMT division. At a cost of \$8,000 each, cars will be fitted with new control systems, cables, lighting, seats, etc.

Pullman, Inc., has formed the Transport Leasing Co., a subsidiary to handle its leasing of special types of freight cars. First in the new TLCX PS-4PB fleet are 100 85-ft piggyback flat cars, built by Pullman-Standard and rented to freight forwarders and other users for operation primarily between Chicago and the Pacific Coast. An additional 150 TOFC flat cars will be built for the leasing subsidiary as steel becomes available.

Wabash has released details of 100 70-ton covered hopper cars ordered from Greenville Steel Car (RL&C, August 1959, p 10) and 400 50-ft 6-in. box cars ordered from its own shops (RL&C, May 1959, p 8). Hopper cars to be of welded all-steel construction and equipped with Timken roller bearings. Fifty of the box cars to have 8-ft single doors and to be equipped with roller bearings and compartmentizers; 200 to have 15-ft double doors and to be equipped with sleeve bearings; 100 will have 15-ft double doors and equipped with roller bearings and adjustable belt rails and door post; 50 will have 15-ft double doors and equipped with roller bearings and fixed rails and adjustable door posts.

Revised Pad Specification Receives Approval

A revised AAR specification for journal lubricating devices became effective on September 1. This followed letter ballot approval of the changes proposed by the Committee on Lubrication of Cars and Locomotives at last June's Mechanical Division meeting.

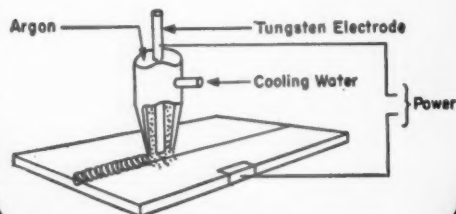
The new specification calls for an identi-

fication tag on each device which will show the date of manufacture. There are standards for the attachment of wicking loops where used; and characteristics for oil retention, wicking and resiliency are specified. New dimensional standards have been established. An appendix to Specification M-918-59 gives details on the steps for having a lubricator receive AAR laboratory tests, and subsequent "conditional approval" and "approval" status.

From Car Building to Repair

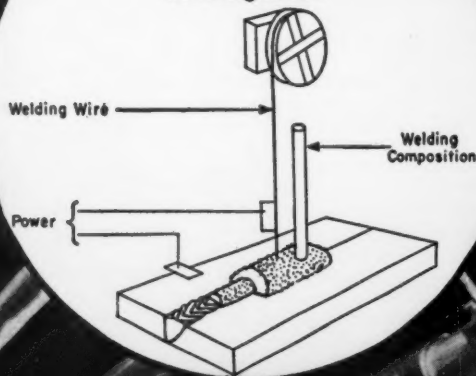
HELIARC

Inert Gas Shielded Arc



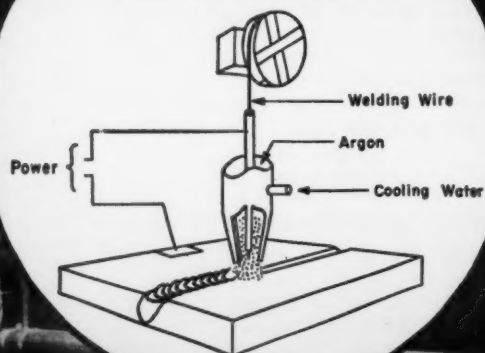
UNIONMELT

Submerged Arc



Sigma

Shielded Inert Gas Metal Arc



FOR THE BEST IN ELECTRIC WELDING... LOOK TO LINDE

... LINDE provides the right welding method!

Inert gas shielded arc welding—

HELIARC Welding is helping railroads save up to 88% of new rolling stock cost by simplifying and speeding many car fabrication jobs. This process, using a tungsten electrode and a shield of LINDE argon, is tops for joining hard-to-weld commercial metals. HELIARC Welding produces high-quality welds that resist corrosion and eliminate costly grinding and finishing.

Submerged arc welding—

Big savings in time and materials in the fabrication and reconstruction of all types of rolling stock are made possible with UNIONMELT Welding. Materials ranging from light gage to heavy plate, adaptable to mechanization, can be most economically joined by UNIONMELT Welding. UNIONMELT Welding is also used extensively for resurfacing metal, providing extra wear and corrosion resistance.

Shielded inert gas metal arc welding—

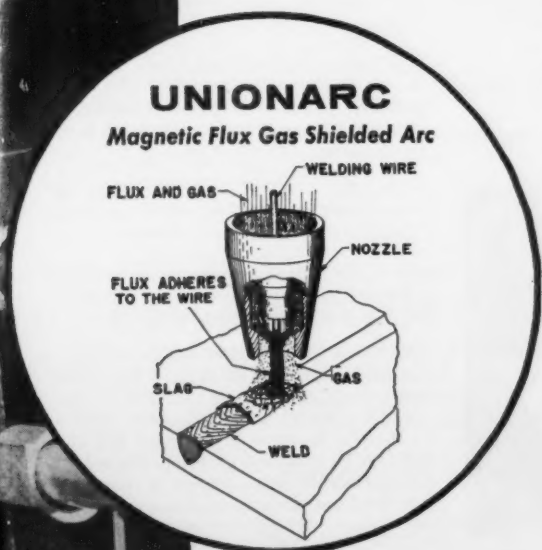
One of the most versatile welding methods for railroad car fabrication is Sigma Welding. LINDE's Sigma apparatus, using a shield of LINDE argon, is ideal for manual welding of commercial metals $\frac{1}{8}$ in. or more thick, and for automatic operation on lighter gage metals to .050 in. Highest quality welds can be made on aluminum thicker than $\frac{1}{8}$ in. at speeds up to 16 inches per minute. Build-up and surfacing jobs are also improved by using LINDE's Sigma welding method.

New! **Magnetic flux gas shielded arc welding—**

UNIONARC Welding, LINDE's latest contribution to the railroad industry, is an extremely fast method for welding mild steel. This method employs a continuously-fed, bare steel wire electrode, magnetically coated with flux conveyed in a stream of carbon dioxide shielding gas. Manual welds can be made easily in any position—vertical, overhead, downhand—with no stops to change electrodes. The speed, versatility, and ease of operation of UNIONARC Welding brings costs down 25% to 65% below those of manual covered electrode welding. Clean, smooth, high-quality welds are provided, even in the presence of moderate amounts of rust, scale, and moisture.

LINDE engineers have worked with railroad men for many years designing, developing and testing electric welding methods and apparatus... to improve road maintenance, equipment repair and shop fabrication. This wealth of experience is yours for the asking. Just call your nearest LINDE office.

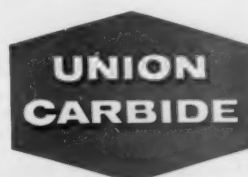
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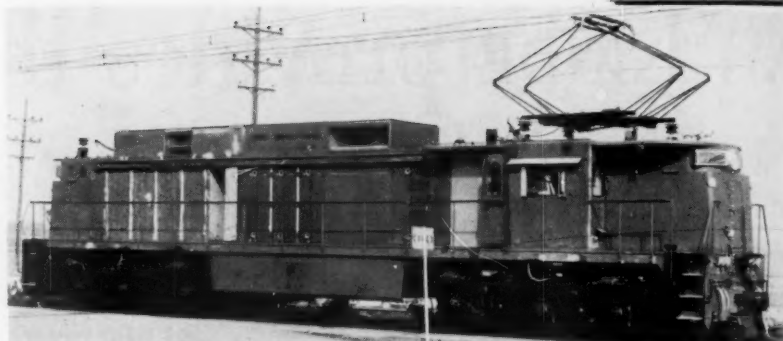
RAILROAD DEPARTMENT

Linde
TRADE-MARK





Piggyback of highway auto transports is increasing; Frisco loading is shown. CDOA discussed subject at last month's Chicago meeting.



Pennsylvania will acquire 66 rectifier-type electric road switches over next three years under \$32 million lease arrangement with General Electric. The 4,400-hp units, patterned after Virginian locomotive shown above, will replace 95 P-5 units used in freight service.

Personal Mention

Delaware & Hudson.—*Albany, N.Y.:* P. E. MCGAUGHAN appointed assistant to superintendent of equipment, succeeding J. F. FORNER, retired.

Erie.—*Cleveland:* PAUL L. GREEN, assistant to superintendent of motive power, retired. *Meadville, Pa.:* VICTOR J. TAYLOR, electrical supervisor, retired.

New York Central.—*New York:* A. A. BURG-DORF and D. M. TUTKO appointed junior engineers. C. M. SMITH appointed process engineer. *Ashtabula, Ohio:* G. SMALEC appointed process engineer, Ashtabula scrap and reclamation plant.

Norfolk & Western.—*Roanoke, Va.:* CLARENCE M. PETTREY, assistant master mechanic, Radford and Shenandoah Divisions, retired.

Santa Fe.—*Arkansas City, Kan.:* DONALD M. MILLER appointed master mechanic, succeeding PAUL A. BUCKMAN, retired. Mr. Miller formerly general foreman at Dodge City, Kan.

Soo Line.—*Minneapolis, Minn.:* A. J. TROWBRIDGE appointed mechanical engineer.



N. C. Dezendorf



R. L. Terrell



T. C. Renner



A. J. Hanisch

Electro-Motive Division
General Motors Corporation

Hyatt Bearings Division

Supply Trade Notes

GENERAL MOTORS CORP., ELECTRO-MOTIVE DIVISION.—*Richard L. Terrell*, administrative assistant to general manager, elected a vice-president of GM and appointed general manager of EMD to succeed *Nelson C. Dezendorf*, now vice-president in charge of Dayton, Household Appliance and Electro-Motive group. *B. B. Brownell* appointed to newly created post of director of engineering and research.

Thomas B. Dilworth, assistant chief engineer, appointed chief engineer, succeeding Mr. Brownell.

HYATT BEARINGS DIVISION.—*T. C. Renner*, assistant chief service engineer, appointed salesman, Chicago area, handling railroad applications. *A. J. Hanisch* succeeds Mr. Renner as railroad service engineer, Chicago area. Mr. Hanisch previously service engineer in Columbus, Ohio.

HUCK MANUFACTURING CO.—*James E. Auckley* appointed engineering representative in Kansas, western Missouri, southern Nebraska and southwestern Iowa. Headquarters, Omaha, Neb.

CRUCIBLE STEEL CO.—*William R. Mogg*, sales manager, Spring division, appointed general manager of division.

SPARTON CORP.—*Reeves P. Comfort* appointed eastern regional sales manager for new Railway Equipment Division.

SOUTHERN ELECTRIC, INC.—Southern Electric has acquired all of the stock of the *Rolin Corp.*, Chicago, which will be operated as a wholly owned subsidiary. *Robert L. Moxley*, president of Southern Electric, will also be president of Rolin. *Robert V. Conners* named vice-president in charge of sales and operations.

BENDIX AVIATION CORP., SCINTILLA DIVISION.—*Edwin B. Watson* named chief engineer, Diesel department, succeeding *Louis J. Garday*, who plans to retire but will continue as full-time consultant.

(Turn to page 74)



E. H. Harriman Memorial Medals were awarded September 16 by the American Museum of Safety for "outstanding performance in railroad safety" during the year 1958. Cyril Ainsworth, president of the Museum, is shown presenting the Gold Medal award to R. E. Sease, president and general manager of the New York, Susquehanna & Western. The award to the St. Louis Southwestern was received by H. J. McKenzie (left), president of the road, and by E. Hicks (right), executive vice-president, for the Union Pacific.

3-way proven protection

FOR JOURNAL BOXES

with

JBS



ACME LUBRICATORS

(AAR Conditionally Approved)

JBS Acme Journal Lubricators* alone have the exclusive batted 100% wool quilted core which retains four times its own weight in oil reserve. Heavy chenille loop surfaces of 30% wool and 70% cotton assure constant resiliency and an ample supply of filtered oil at all times even at a temperature of 45° below zero. The rectangular shape of JBS Acme Lubricators is particularly designed to insure snug fit and prevent displacement in the journal box. They require no modification of the standard journal box, and assure better performance with less servicing.

*Patented

AXLE-STOP DUST GUARDS

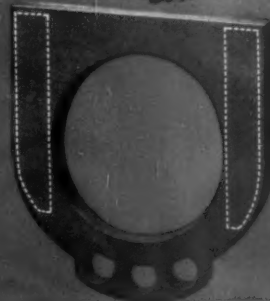
The installation of Axle-Stop Dust Guards as a combination dust guard and axle stop limits the free motion of the journal, wedge and brass upon impact and brake application. Instead of the brass and wedge taking the shock of impact, two steel inserts positioned in the Axle-Stop Dust Guard absorb the shock, prevent the cocking of the brass and definitely lessen the possibilities of a hot box. Bearing distortion is eliminated, permitting it to assume its full crown and attain a life which has never before been possible.

RECLAMATION SERVICE

Journal Box Servicing Corporation is a veteran of more than 30 years' experience in reclaiming car oils and waste. Today, its 17 plants, strategically located in 14 states, are performing the same highly efficient and economical function for lubricator pads, restoring them to their original usefulness at a small fraction of their original cost.

WRITE TODAY for descriptive folders.

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GUARANTEED Quality, Workmanship
and Material as represented.

JOURNAL BOX SERVICING CORPORATION

"More than 30 Years in Car Lubrication"

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FACTORY: DALTON, GEORGIA

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LOCOMOTIVES AND CARS WHAT'S NEW IN EQUIPMENT



Portable Battery Chargers

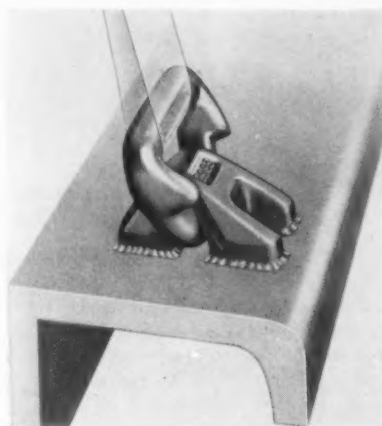
Variable voltage rectifiers are equipped with silicon rectifying diodes for use on batteries with up to 32 lead-acid cells or 50 alkaline cells. In railway service, a portable charger (VVR) eliminates the need to remove batteries from diesel locomotives or passenger cars for charging; it can be wheeled right to the battery. A wall-mounted model can be used for charging jobs in a battery shop. *Exide Industrial Division, Electric Storage Battery Co., Dept. RLC, Rising Sun and Adams ave., Philadelphia 20.*



Pipe Insulation

A urethane foam pipe insulation, UNAR-CO U200, is especially suited for use at temperatures ranging from minus 300 deg

F to plus 220 deg F. It is a closed-cell synthetic, both heat and chemical resistant, and will not burn. Thermal conductivity tests have shown it to have a K factor of only 0.14 at 70 deg F mean temperature. A closed cell content of 85 per cent plus is said to give the insulation a high degree of resistance to water and vapor. Density of the material is 2.3 lb per cu ft. It is available in half-round sections of nominal thickness in standard pipe sizes, and individual sections are 36 in. long. It can be cut and applied with standard tools and is non-toxic and non-irritating. *Union Asbestos & Rubber Co., Fibrous Products Div., Dept. RLC, 1111 West Perry st., Bloomington, Ill.*



Gondola Anchor

This retractable gondola anchor is welded to the top chord angle of the car. When not in use, link retracts to present a minimum height above chord angle. It can also be used at side sill for flat cars. *MacLean-Fogg Lock Nut Co., Dept. RLC, 5535 N. Wolcott ave., Chicago 40.*

Dust Guards

Coresote dust guards, made from solid 3/4-in. thick homogenous board manufactured by the Homasote Company, are said to have given excellent journal-box protection from dust and grit when tested in the laboratory and in actual road service. The board is made from long fibre Canadian spruce and is water, rot, fungus and termite proof. The fibres are broken down to the size required to fully mesh within the board. Oil in the box impregnates the guard, making it more flexible and resilient. The guard, it is said, will not bind, split, chip or warp.

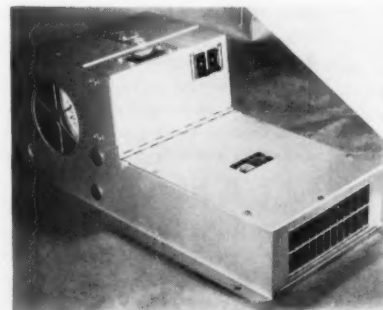
The journal-box well top is sealed with

Coresote plugs or wedges which are hammered in place. *Penn Fibre & Specialty Co., Dept. RLC, 2024-2030 E. Westmoreland st., Philadelphia 32, Pa.*



Pipe Repair Clamp

The new lug design on an improved heavy duty Patchmaster pipe repair clamp allows the clamp to conform to the contour of the pipe under high torque without biting into the pipe. The Buna N pad will withstand high clamping pressures without extruding and is adaptable to oil, gas, water and steam. The clamp is manufactured for pipe sizes from 1/2 in. through 8 in. and in widths of 3, 6, 9 and 12 in. *Marman Division, Aeroquip Corp., 11214 Exposition Blvd., Los Angeles 64, Calif.*



Cab Heater

The new Modulelectric cab heater is designed to supply spot heat for road locomotives, RDC cars, diesel switchers, etc. It is mounted vertically in a cab with the outlet close to the floor, and puts out 13,500 Btu's per hr (4 kw) maximum heat. An out-

(Continued on page 16)

**this
field coil
will now
run
25%
cooler...**



**Southern Electric helps solve
traction motor field-coil insulation problems
associated with high heat deterioration!**

To absorb more power for longer periods of time, it is absolutely essential that a new insulation system have superior heat dissipation properties.

At Southern Electric, through extensive and rigorous wind tunnel tests that simulated 10 years of severe road service, the SOUTHERN 777 SYSTEM was designed and developed. It is a correct combination of special-formula EPOXY and other insulating materials, and the most modern vacuum impregnating equipment capable of achieving an ultimate vacuum of 10

microns or 29.999+ inches of mercury (99.99+% of absolute vacuum)!

The SOUTHERN 777 SYSTEM of reinsulating means: 1) Complete encapsulation... void-free bonding of insulating material to the coil, 2) Greatly improved service life for your original equipment coils, 3) Upgraded electrical ratings, and, 4) Drastically reduced failure rate.

Our manufacturing facilities are available for your inspection; our engineers will welcome your inquiry.

SOUTHERN
ELECTRIC INCORPORATED



*where research
begins with
industry's problems*

5025 COLUMBIA AVENUE, HAMMOND, INDIANA

3 STRAN-STEEL RAILROAD PRODUCTS SAFEGUARD ALL VITAL AREAS, LENGTHEN BOXCAR LIFE

1. NAILABLE STEEL DOORPOSTS

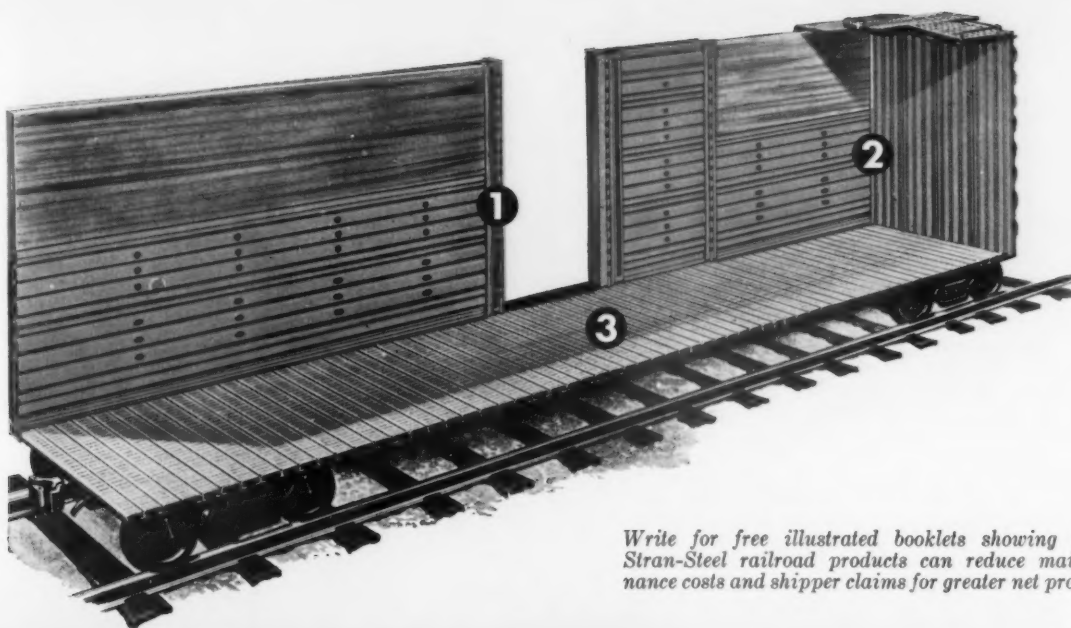


2. ANCHOR LINER



Stran-Steel Anchor Liner helps protect sidewalls and endwalls against the damage which commonly causes 70% of rip-tracking. Recessed strap anchors make bracing of lading quick, easy and safe.

◀Nailable Steel Doorposts with steel grooves take repeated nailing of grain doors without weakening or splintering (see inset photo), strengthen vulnerable doorways, protect against lading and lift truck damage, and stand up for years of Class A service. Nailable Steel Doorposts can be used with either sliding or plug doors.



Write for free illustrated booklets showing how Stran-Steel railroad products can reduce maintenance costs and shipper claims for greater net profits.



3. N-S-F®

Side heights are variable; endwalls full length. GLX-W high-strength steel reduces dead weight compared to ordinary carbon steel liners of equal strength.

Nailable Steel Flooring solves floor repair problems, adds structural strength to the underframe, and helps move more freight with fewer cars. N-S-F cars carry all types of lading—rough, sacked, finished or bulk and stay in revenue service longer. Unique nailing grooves insure secure blocking, floors remain damage-free.

Seventy leading railroads now have more than 72,000 N-S-F freight cars in service. If you would like detailed information and cost studies, contact your nearest Stran-Steel representative. Offices in Chicago, New York, Philadelphia, St. Louis, Cleveland, San Francisco, Minneapolis and Atlanta. In Canada, Stran-Steel railroad products are made and sold by International Equipment Co., Ltd., Montreal.



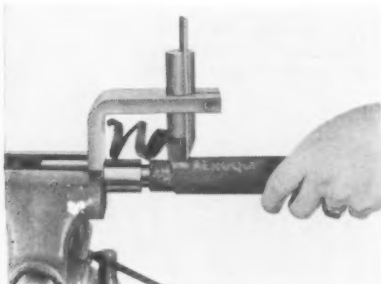
Dept. L-43
STRAN-STEEL CORPORATION
Detroit 29, Michigan • Division of



WHAT'S NEW IN EQUIPMENT—(Continued from page 12)

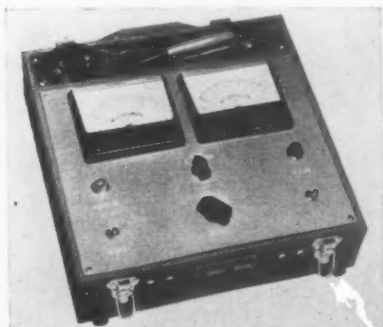
let for an accessory window defroster is provided. In summer, the fan and defroster alone can be operated to remove fog from cab windows. Safety overheat protection shuts off the heating coils if circulating fan should fail.

The heater is being installed in the new C&NW double-deck passenger cars with cab control on end of cars. *Vapor Heating Corp., Dept. RLC, 6420 W. Howard st., Chicago 48.*



Hose Stripping Tool

The F-2282 hose-cover stripping tool is designed to remove the outer rubber cover from high-pressure hoses—sizes —4 through —32—prior to assembling the fitting. It has a steel frame and a specially hardened steel blade holder and can be used in a standard shop vise, lathe chuck, drill press or an Aeroquip assembly machine. Each tool is assembled and pre-set for the particular size hose. *Advertising Dept., Aeroquip Corp., Dept. RLC, Jackson, Mich.*



Portable D-C Insulation Leakage Test Set

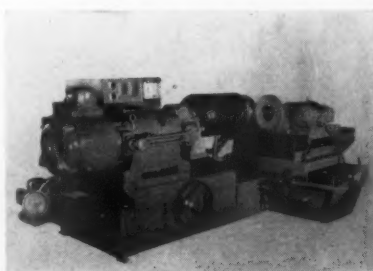
A portable test set, the Hypotr Model 5205 high-voltage tester, permits testing of railroad electric traction motors and generators for insulation leakage current and breakdown voltage with d-c potentials up

to 5,000 volts. The test voltage is continuously variable from 0 to 5,000 volts d-c, providing leakage current tests for motors, generators, switchgear, cables, and other electrical accessories, including those operating at a-c line potentials up to 2,500 volts. One indicating instrument meters the output voltage directly across the test terminals, and the other shows leakage current with a selection of four sensitivity ranges: 0-2, 0-20, 0-200, and 0-2,000 microamperes. Leakage currents as low as .05 microamperes are read on the low scale.

The self-contained power supply operates by plug-in connection to 115-volt a-c line, using long-life selenium rectifiers to provide 5,000 volts d-c with a high current output of 15 milliamperes available to rapidly charge capacitive loads.

Newly developed electronic metering circuits measure the test voltage at maximum accuracy directly in the output circuit and protect the output voltmeter and microammeter from damage due to shorts or excessive current. Guard circuits control stray currents for accuracy of low-leakage current readings.

The instrument is housed in a single welded-steel carrying case. It weighs 24 lb. *Associated Research, Inc., 3777 W. Belmont ave., Chicago 18.*

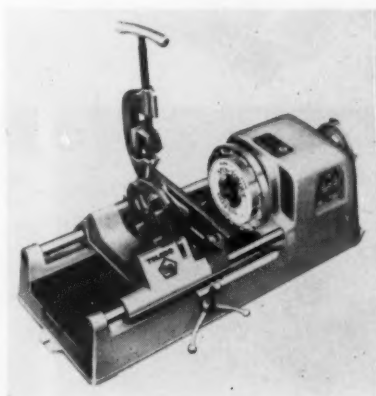


Grinding and Seasoning Machine

A compact grinding and seasoning machine, designed initially for refinishing the armatures of diesel-electric locomotives, will also handle many different types of motor and generator rotors between 20- and 48-in. diameter, weighing up to 9,000 lb. One of the machines is now in operation in the shops of the Canadian National at Winnipeg, Man. A work-positioning system, in which the armature shaft end rests in a two-piece roller mounting, reduces set-up time to less than 30 min. Floor-to-floor time per armature is about 80 per cent less than with conventional machines.

The armature is driven at up to 3,000 rpm by a 30-hp motor with solenoid brake directly coupled through a stepless variable drive. The grinding-wheel head is hy-

draulically controlled, and the complete work cycle can be performed from one position. A separate flame-heating unit for the seasoning operation is remote controlled. Heat and speed factors are measured by recording instruments which recordings can be checked to determine if the commutator was ground and seasoned at the correct speed and temperature. *Pathex (Canada) Limited, Dept. RLC, 107 Tycos Drive, Toronto, Ont., Canada, or Pathex Limited, Dept. RLC, Suite 1103 Liberty Bank Bldg., Buffalo, N. Y.*



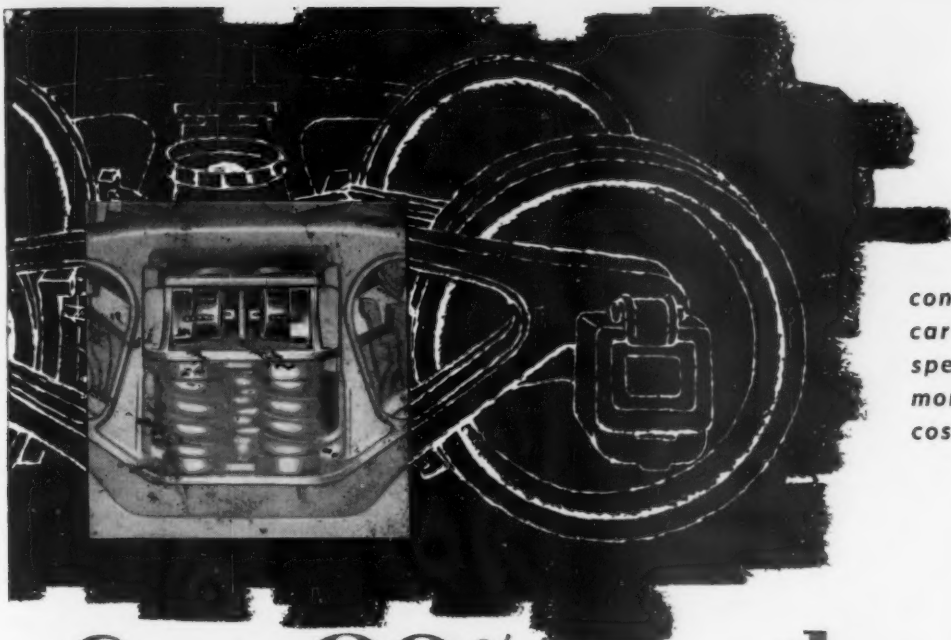
Power Pipe Machine

The Toledo No. 98 power pipe machine is designed for threading, cutting and remaking all sizes of pipe through 2 in. and for threading 1/4-in. to 1 1/2-in. bolts. It is supplied either with cam-type or quick-opening die heads. The former is mounted directly on the carriage; the latter, by means of an adapter plate. The die head, cut-off tool and reamer can be used as close as 3/4 in. from the chuck. The carriage travel of 10 in. minimum exceeds Federal specifications by at least 2 in. Chuck, centering device and gear train are interchangeable with other Toledo power machines. *Toledo Pipe Threading Machine Co., Dept. RLC, Toledo, Ohio.*

Vinyl Coating for Covered Hopper Cars

A maintenance system that is said to give practically complete protection for covered hopper cars uses Carhide coating manufactured by the Pittsburgh Plate Glass Company and based on Bakelite vinyl resins. The coating is used at the Butler, Pa., plant of Pullman-Standard where car surfaces are first shot blasted to remove old paint, scale and dirt. A red lead primer, UL-11795, is then hot sprayed. This is

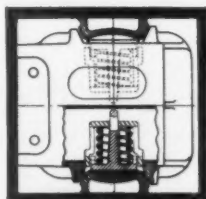
(Continued on page 18)



convert old freight
car trucks to high
speed service this
money-saving,
cost-cutting way!

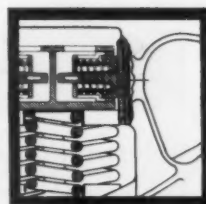
Save 80% over the cost of new Freight Car Trucks

NEW



New Large control spring for
full face pressure, longer life.

NEW



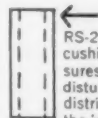
New Center Retention Means
for simplified assembling and
dismantling.

with the NEW HOLLAND RIDE STABILIZER RS-2

There's no need to let those serviceable old Freight Car Trucks be limited to slow speed service when you can convert them to profitable operation at a fraction of the cost of new trucks... The Holland Ride Stabilizer RS-2 has proven to give the same high-speed, lading-protecting, easy-riding characteristics you get in new, costly freight trucks.

You can convert any bolster of A. A. R. approved design and stabilize the ride laterally, vertically and longitudinally... The direct spring loaded control system of the Holland RS-2 **does not** cause uneven wear of the Journal Bearing when abnormal forces are exerted. Wedge made pressures just **do not** occur. Installation of the RS-2 components is unusually simple... And Holland Engineers will give you on-the-job assistance.

Write or call for the new Tell-All
Bulletin RS-2.



RS-2 Spring
cushioned pres-
sures do not
disturb load
distribution on
the journal.



Wedge made
pressures
disturb load
distribution on
the journal.

Holland Volute Snubber Springs



Either 2½" or 1½"
Spring Travel.



STYLE E-2 Volute Snubber
Spring, 2½" Travel in
50 Ton Group.

Upgrades ride by introducing an unusually smooth snubbing action with an exceptionally high load carrying capacity. Holland's principle of utilizing the sliding action of telescoping radially compressed coils with ample friction area eliminates the "bombarding" problem.

518R

HOLLAND COMPANY

332 S. MICHIGAN AVE. • CHICAGO 4, ILLINOIS

for the finest in
freight car truck controls!

WHAT'S NEW IN EQUIPMENT—(Continued from page 16)

followed in less than 45 min by two hot-spray grey finish coats, UL-11800.

This two-coat system is said to withstand the effects of chemicals and weathering, permitting cars to remain in service for years without repainting. The coating does not become reactive with cargoes.

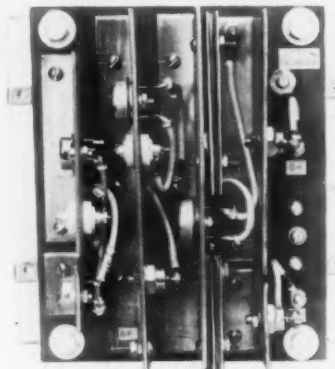
Hot-spray application is at temperatures between 140 to 150 deg F. This permits the paint to dry fast and eliminates the need for a thinner. There is no extended waiting for cars to dry because the system usually set up by the time the painted car is ready to leave the shop. The Great Northern, Baltimore & Ohio, Union Pacific, New York Central, Pennsylvania, Southern Pacific, and New Haven are among the roads using the coating. *Union Carbide Plastic Co., Division of Union Carbide Corp., Dept. RLC, 420 Lexington ave., New York 17.*



Tubular Quartz Lamps

A new line of Quartzline lamps are presently available in 500- and 1,500-watt sizes. They are said to give more light from a smaller package, clean themselves inside and out, and serve appreciably longer economic lives because of the iodine cycle they employ. It is also said they make possible higher efficiency high-voltage lamps and, under thermal shock, the heated quartz tubes will not crack or break even when suddenly exposed to ice or cold water.

The lamps consist of a coiled tungsten filament supported at intervals through a quartz tube $\frac{3}{8}$ in. in diameter. On each end is a miniature recessed contact base suitable for push-pull socketing. Their rated life is 2,000 hr. The 500-watt lamp is just over 4½ in. long and operates on standard 120-volt power, producing 10,500 lumens. The 1,500-watt lamp is about 110 in. long and is designed for 277-volt operation. It is rated at 33,000 lumens. *General Electric Co., Dept. RLC, Nela Park, Cleveland 12.*



Static Voltage Regulator

A static voltage regulator, designed to give maintenance-free performance and high-speed response over a mechanical regulator is completely adaptable for diesel locomotives. Its static components, transistors, Zener diodes, rectifiers, resistors and capacitors closely maintain the auxiliary generator voltage over the complete speed and load range of the generator.

A voltage adjustment of plus or minus three volts from the factory setting of 73 volts is provided to allow for varying battery conditions. Other than this control, no maintenance is required. The adjustment is a locked screwdriver setting. No damage to the regulator can occur by electrically exceeding the range of adjustment. The wiring is designed for 200 deg C for long wire life expectancy. The regulator recovers from a disturbance in microseconds, and the voltage recovery in tenths of a second. Overshoot and undershoot from full load application or removal cannot be detected by a voltmeter. Operation at 150 deg F ambient and under the most strenuous field current conditions is said to show no regulator temperature defects.

The unit is mounted in a ventilated metal case, 9-in. by 9-in. by 8-in. deep, and can be applied in the space normally taken by the moving-contact type regulator. It requires four mounting bolts and three wire connections. The regulator can handle d-c generators up to 75 volts with a maximum field current of 10 amp. Five Fairbanks-Morse locomotives are now equipped, the first unit being applied in April. *Fairbanks, Morse & Co., Dept. RLC, 600 S. Michigan ave., Chicago 5.*

Box-Car Lining

Fifty B&O box cars are to be equipped with an Alcoa aluminum box-car lining which is said to combine exceptional light weight, high impact strength, and ease of application. Because of the inherent characteristics of the metal, car walls are spark-proof, will not retain odors, and do not require

paint or other protective coatings. A 42-in.-high extruded lining installed in a standard 50-ft 6-in. box car with 15-ft doors weighs only 1,150 lb. Tongue-and-groove extruded panels of the lining fit into ordinary tongue-and-groove wood linings. Side panels are mounted horizontally and attached to car side posts with standard drive-pin blind rivets. The completed wall has a smooth surface, flush with adjacent wood areas. There are no projections into lading space and no special clips or fasteners are required.

All panels are 8-5/8 in. wide and extruded in alloy 6063-T6. Three thicknesses are available. Bottom sections are ¼ in. Intermediate and top sections are 3/16 and ½ in. thick, respectively. Panels are designed so that maximum span of unsupported flat areas is less than 4 in.

Installations may be started at either top or bottom and may vary in height according to the number of panels employed. A special starter strip is available for end linings which utilize the same panels installed vertically. The strip is fastened at the center line and divides end lining in half for easy replacement in the event of damage. Side panels can be removed from the bottom. *Aluminum Co. of America, Dept. RLC, 1501 Alcoa Bldg., Pittsburgh 19, Pa.*



Industrial Cleaner

Two models of the motorless Vibro-Pneumatic industrial cleaner are especially adapted for cleaning the interiors of all types of railroad equipment. The Pick-a-Back feeds into a nylon dust receiving bag carried on one's back, or, using a 10-ft exhaust hose, the receiver can be hooked over any object. The Castored Tank model feeds into a container that cleans and washes the suction air before exhausting it to the atmosphere.

The actuators of the units can be quickly converted from one size wand to another. No wrench is needed. A fumigant ejector is available for use in the control of vermin. *Vibro-Pneumatic Cleaner Co., Division of Patterson Products, Dept. RLC, Post Office Box 117, Detroit 2.*

(Turn to page 75)

Get fast, safe, effective cleaning with

AEROWASH-A

all-purpose liquid cleaner for painted surfaces

HERE'S A NEW PRODUCT that will get all of your painted surfaces cleaner than ever before—yet is completely safe on paint!

Clean diesel exteriors with Aerowash-A! It's ideal for either hand brushing or machine cleaning.

Clean interiors with Aerowash-A! There's no fire hazard when you use AEROWASH-A. And your crew will like its pleasant odor. Ideal for both diesels and passenger cars.

Reduce labor costs with Aerowash-A! The faster, more effective cleaning action of AEROWASH-A means your men can do the job in less time. And there's no powder to dissolve. Just dilute it and it's ready to go. What's more, AEROWASH-A can even be piped directly into automatic cleaning operations.

Get more details on AEROWASH-A now . . . just ask your Wyandotte cleaning specialist. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California, and Atlanta, Georgia. Offices in principal cities.*



Wyandotte CHEMICALS
REG. U. S. PAT. OFF.

J. B. FORD DIVISION

SPECIALISTS IN RAILROAD CLEANING PRODUCTS

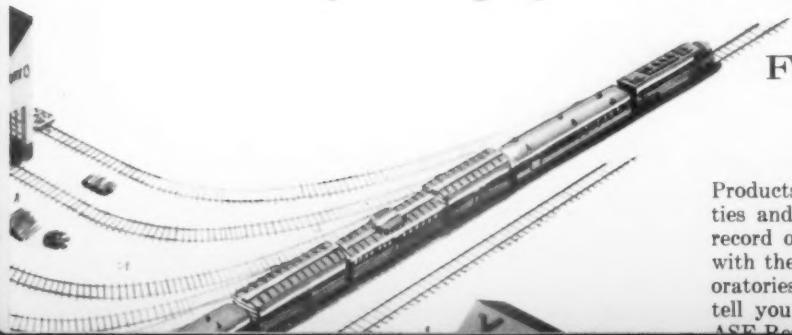


Never carried a
pound of payload...

*yet this ASF Test Train is saving
millions yearly for American railroads!*

From research to reality
in railroad progress

Products for tomorrow come only from imagination, facilities and research. ASF men of imagination have built a record of progress with the famous ASF Test Train, and with the oldest and largest metallurgical and research laboratories in the industry. Dynamic successes of the past tell you that tomorrow's product reality will come from ASF Research of today.





Log of the American Steel Foundries Test Train

RIGHT-OF-WAY USED	WHERE RUN	NO. OF RUNS	DURATION OF TEST	TOTAL MILEAGE
C.M.ST.P. & P.	Milwaukee, Wis.—Portage, Wis.	56	8/22 to 11/26/40	9,632
M.P.	N. Little Rock, Ark.—Bald Knob, Ark.	72	1/14 to 5/2/41	7,200
N.Y.C.	Englewood, Ill.—Elkhart, Ind.	53	6/15 to 10/28/42	8,480
A.T. & S.F.	Chicago, Ill.—Chillicothe, Ill.	1	4/22/43	260
A.T. & S.F.	Chicago, Ill.—Kansas City, Mo.	1	4/29/43	900
A.T. & S.F.	Chicago, Ill.—Ft. Madison, Iowa	4	5/1 to 5/20/43	1,880
Development of principle of combining proper absorption thru built-in snubbing with long-travel springs and attendant removal of spring planks and spring plates for cost reduction.				
C. & N.W.	Proviso, Ill.—Clinton, Iowa	32	2/28 to 4/21/44	3,968
G.N.	St. Paul, Minn.—Duluth, Minn.	34	5/7 to 9/9/44	10,880
A.T. & S.F.	Chicago, Ill.—Ft. Madison, Iowa	40	10/30 to 12/14/44	8,800
A.T. & S.F.	Chicago, Ill.—Ft. Madison, Iowa	96	3/19 to 12/7/45	21,120
S.P.	Oakland, Calif.—Sacramento, Calif.	35	2/20 to 4/26/46	6,020
A.T. & S.F.	Chicago, Ill.—Chillicothe, Ill.	20	7/8 to 8/20/46	2,340
A.T. & S.F.	Chicago, Ill.—Ft. Madison, Iowa	12	9/2 to 10/1/46	2,640
Proving constant control principle of Ride-Control truck for all speeds up to 90 miles per hour.				
I.C.	Clinton, Ill.—Gilman, Ill.	97	4/25 to 11/6/47	12,028
C. & O.	Grand Rapids, Mich.—Grand Ledge, Mich.	22	1/8 to 2/6/48	2,200
G.M. & O.	Venice, Ill.—Springfield, Ill.	22	6/10 to 7/3/48	1,892
*I.C.	Clinton, Ill.—Gilman, Ill.	78	7/27 to 11/13/48	9,672
Development of Ride-Control Package to modernize older cars and permit riding comparable with new cars.				
***I.C.	Clinton, Ill.—Gilman, Ill.	72	3/29 to 7/1/49	8,928
*I.C.	Clinton, Ill.—Gilman, Ill.	81	7/5 to 10/28/49	10,044
*I.C.	Clinton, Ill.—Gilman, Ill.	56	4/19 to 7/18/50	6,944
I.C.	Clinton, Ill.—Gilman, Ill.	28	7/24 to 8/31/50	3,372
AAR Tests for evaluating modern trucks.				
G.M. & O.	Venice, Ill.—Springfield, Ill.	54	7/30 to 10/19/51	4,752
C.P.	Westmount, Quebec—Foster, Quebec	28	9/25 to 10/14/52	1,890
Cars loaned to Canadian National for truck evaluation.				
**P.R. & S.L.	Atlantic City, N. J.—Hammon, N. J.	10	6/22 to 6/26/53	458
Demonstration runs of Ride-Control Package at AAR Atlantic City Convention.				
C.B. & Q.	N. St. Louis, Mo.—Old Monroe, Mo.	50	9/14 to 11/18/53	4,100
C.B. & Q.	N. St. Louis, Mo.—Old Monroe, Mo.	54	8/23 to 11/24/54	4,428
Evaluating use of roller bearings with modern truck designs.				
C. & O.	Grand Rapids, Mich.—Grand Ledge, Mich.	42	6/11 to 7/6/56	4,032
Cars loaned to C. & O. for truck and package evaluation.				
C.B. & Q.	N. St. Louis, Mo.—Old Monroe, Mo.	65	9/5 to 12/18/56	5,330
C.B. & Q.	N. St. Louis, Mo.—Old Monroe, Mo.	37	5/19 to 7/31/58	3,034
C.B. & Q.	N. St. Louis, Mo.—Old Monroe, Mo.	28	11/3 to 12/12/58	2,296
Latest ASF development work from which new improvement of important nature can be expected.				
		TOTAL RUNS 1,280	TOTAL MILEAGE 169,520	

*Conducted by Association of American Railroads.

**A.A.R. Convention.

***Includes Timken runs.



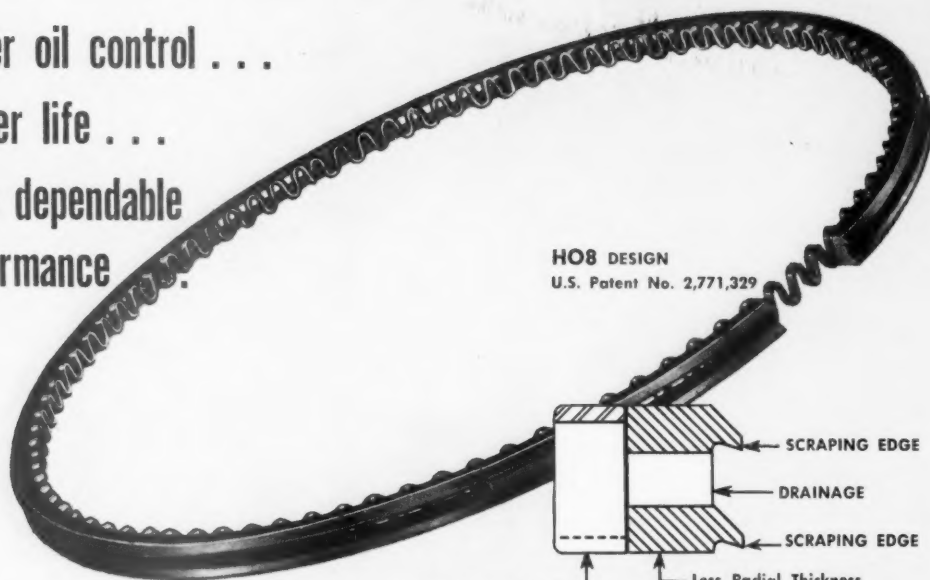
AMERICAN STEEL FOUNDRIES

Prudential Plaza, Chicago 1, Illinois

Canadian Manufacturer and Licensee: International Equipment Co., Ltd., Montreal 1, Quebec



- Better oil control . . .
- Longer life . . .
- More dependable performance.



Exclusive "Equalizer"
for Soft, Uniform Pressure
and Utmost Conformability

Pedrick Formflex ^{"HEAVY DUTY"} Oil Ring

With Pedrick's HO8 Formflex oil ring, you get far better oil control for three important reasons:

1. You have TWO oil-scraping edges.
2. Extra wide central drainage channel.
3. Exceptional *conformability* provides positive contact with the cylinder wall under even the most severe conditions.

The secret of the exceptional conformability of this heavy-duty ring lies in Pedrick's exclusive "Equalizer", a specially designed type of steel expander that provides a soft, uniform pressure all the way round the cast-iron cylinder-contacting ring. In ad-

dition, the radial thickness of the cast-iron ring is less, increasing its flexibility.

The result is a more perfect cylinder seal and quicker, more effective drainage. You get minimum wear, lower oil consumption, longer life, less time lost due to overhauls.

Easy to install and moderate in cost, Pedrick's Formflex Heavy-Duty HO8 is just one of a family of top-flight ring designs from Pedrick . . . engineered and manufactured to provide the utmost in dependability and performance. If you wish, our engineers will be glad to consult with you. Or write for our free ring catalog. WILKENING MANUFACTURING Co., Philadelphia 42 and Toronto 2.

Pedrick

PISTON RINGS

PEDRICK PIONEERED *conformable* RINGS FOR BIG-BORE ENGINES



NEW ARAPEN® RB 350 JOURNAL BEARING LUBRICANT

GIVES LONG SERVICE AT WIDE RANGE OF OPERATING TEMPERATURES

Arapen RB 350 is another new Esso product designed to reduce railroad operating costs. Perfected by Esso Research, Arapen RB 350 is now available to offer you a combination of lubricating advantages required for anti-friction journal bearings.

Arapen RB 350 provides unexcelled lubrication from -30° to 250° . In the coldest weather, it remains soft and provides maximum lubrication. And at the highest temperatures, it provides a tenacious lubricating film needed under full-load conditions.

Arapen RB 350 passes the difficult

100,000 double stroke test without appreciable change in consistency. This remarkable sheer stability means Arapen RB 350 "stays put" without softening, gives excellent and long-lasting lubrication, reduces leakage through seals, requires less make-up grease.

For more information on the performance of this outstanding new grease, and for expert technical assistance available through an Esso Sales Service Laboratory, write: Esso Standard Oil Company, Railroad Sales Division, 15 West 51st Street, New York 19, N. Y.



RAILROAD PRODUCTS

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EDITORIALS

The Nutsplitter

The term "nutsplitter" was a derogatory designation for a railroad mechanic 40 years ago. It was used facetiously, but at the same time it was a fact. It was easier to remove a rusty nut with hammer and drift than to use a long-handled Stillson with a pipe on the handle.

The recent sessions of the Locomotive Maintenance Officers Association held in Chicago showed how far the locomotive maintainers have come since then. They also indicate quite poignantly that they still have a long way to go. And that going needs to be done quickly.

Diesel locomotive maintenance costs are rising. This is in part due to the fact that the age of locomotives in service is rising. But the maintenance officer who uses this alibi is not going to satisfy management. There was insufficient time for discussion of the LMOA reports. They showed how the maintenance officers are striving to include greater precision and more automation in their shop practices.

A few of the things discussed at the meetings serve to

emphasize the growing requirements of maintenance. For example: Work on roller bearings requires extremely close tolerances. Work on injectors calls for flatness of metal surfaces which is measured to millionths of an inch with monochromatic light. Such things require degrees of cleanliness that were unheard of a few years ago. It was said that such apparently rough and heavy things as bull gears should not be pressed off and on the axle unless necessary because it would disturb alignment. The need for better gear and pinion tooth contours is evidently necessary in order to reduce vibration which damages motors.

A call was made for more accurate wheel slip control to prevent damage caused by overspeed. The need for all these and many more developments which can reduce maintenance costs and extend the economic life of diesel locomotives were made evident.

Maintenance costs now generally exceed depreciation and management will do well to explore thoroughly the needs of its shops.

A "Giant Step" in Wheel Shops

At the Coordinated Mechanical Associations' meeting last month at Chicago both locomotive and car men were keenly interested in the outstanding advances that have been made in the automation of wheel and axle work. Developments in automated machine tools and material handling equipment during the past year were called a "giant step" in wheel shop progress. And truly the achievements in this field are just that.

One big question that each railroad has to answer with respect to the installation of the new machines and techniques is "How much is economically justified?" An excellent answer to this question was outlined by the Locomotive Maintenance Officer's Committee headed by G. M. Beischer, chief mechanical officer, Western Maryland. This committee pointed out that wage rates have risen 3.4 times since 1925, doubled since 1946. Wheel shop production should have increased in the same ratio just to maintain the railroad's cost position.

Roads with requirements for 100 wheel sets per trick should investigate the economic advantages of the completely automated shop (described in the April issue of this publication). However, any road can take advantage of portions of this shop. If there is a requirement for 40 turned axles per day, then one automated axle lathe can be justified. Ceramic tools can be utilized on any type machine by increasing horsepower. Cutting speeds are ten times that of high speed steels. Automatic loading and unloading of machines can improve production about 25 per cent.

The results of a survey presented by the committee indicated that on many roads the door-to-door labor ex-

pense is approximately 15 dollars per wheel set. With the automated shop it is about 83 cents. For most roads, there is probably a median point.

In planning a wheel shop, F. G. Fisher, assistant superintendent motive power and rolling stock, Reading, proposed that all roads should first make a scale model. He recalled that he had been told by men who had built a new shop that they wished they had a second chance. He said management is reluctant to invest large sums to correct mistakes; scale models are most helpful in avoiding them.

These outstanding accomplishments in the application of automation to wheel and axle work are of great value to the railroads in their fight to reduce operating costs. Each road should determine how best to utilize the inherent economies built into the machines and material handling equipment.

The Car Department Officers committee called attention to the impact of a growing number of freight-car roller bearing installations on present wheel shops. It is inevitable that shops will have to be equipped for processing axles for roller and sleeve bearings, also for inspecting and rebuilding these package bearing assemblies. Because bearings are assembled with the wheel set in the shop, new work areas and operations will have to be established.

While the effects of roller-bearing applications have been met in shops processing locomotive and coach axles, the need for producing these axles in freight-car-wheel shops must still be met. Some roads have made a start, but much remains to be done.



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Visual signal indication, with no noise interference, no echoes.
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Locates troublesome high resistance grounds.
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First all-purpose machine, combining D.C. and A.C. high potential testing with proved ground locating ability.
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...with the Signal Generator connected to the locomotive's electrical system, feeds a low-frequency pulsating current into the system. Signals follow the wiring to the fault where the signal indication is dissipated. The Signal Receiver, much like a Geiger counter, is moved along the wire or conduit by the operator. On reaching the ground fault, the loss of signal indication is visually recorded on the meter.

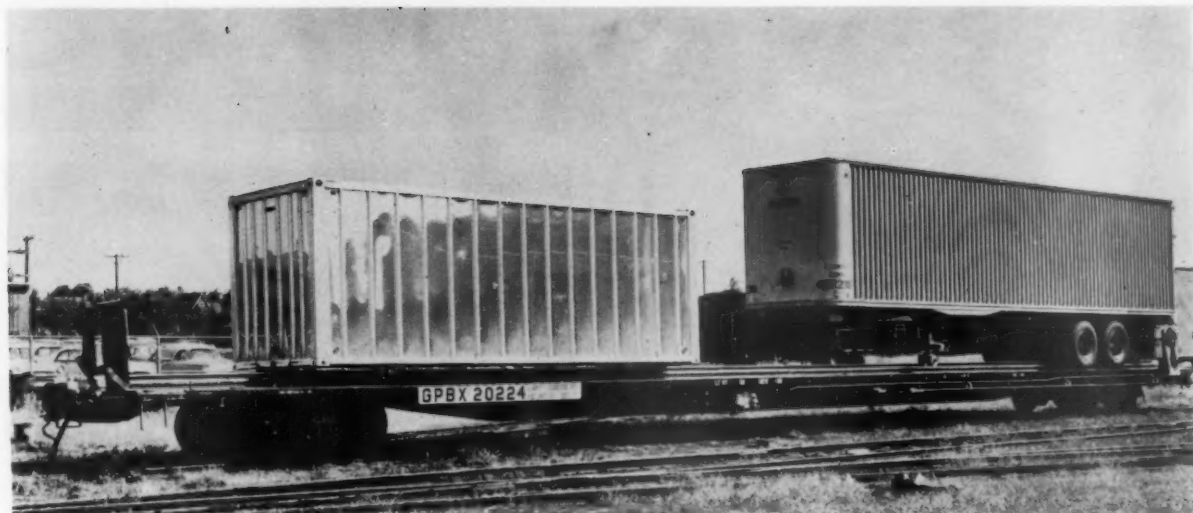
AJAX

CONSOLIDATED COMPANY

Division of Southern Electric, Inc.

4615 West 20th Street

Chicago 50, Illinois



G-85 can carry container and trailer at same time. Shock is absorbed through new trailer king-pin hitch or the container tie-down hooks.

GATC Develops 'Universal' Piggyback Car

Car has been developed to suit the various types of piggyback systems which have evolved to date

General American's new piggyback car is designed to handle all types of highway equipment including standard semi-trailers, semi's with automatic landing gear, containers, tank containers, auto carriers and moving vans without any special equipment or tools needed for tie-downs. It can be operated with all other types of piggyback cars, either specially built or converted flats. No special terminal facilities are needed for either trailers or containers.

Designated temporarily as the G-85, its basic design is a broadened application of the Clejan principle—a center sill which forms both the principal structural member of the car and center rails which guide trailers or containers in place. Runways for tires of trailers not equipped with Clejan attachments are provided. The center sill can carry trailers and tractors which are equipped with dollies. Clejan bridging rails and standard bridge-

ing ramps are installed at the ends of the car.

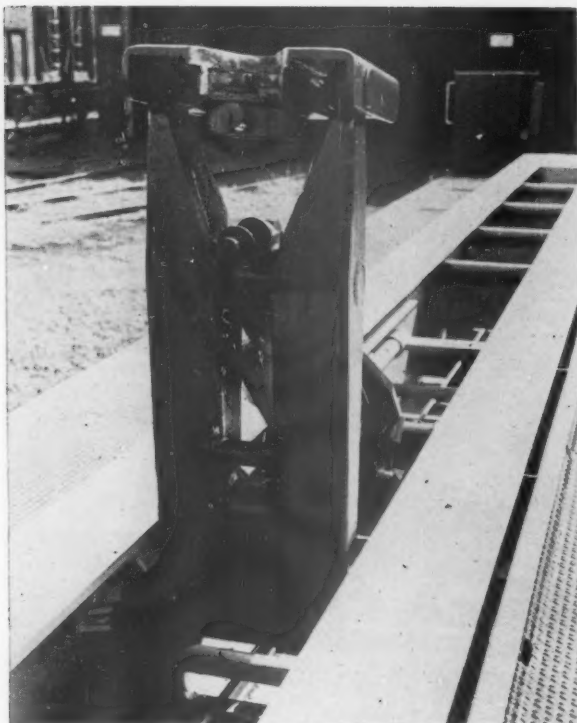
Trailer Hitch

A new design trailer tie-down hitch is part of the standard Clejan shock-absorbing mechanism. All tie-down operations are performed from the tractor cab. The hitch is raised by a hook on the tractor, and is retracted by gravity when two locking plungers are released. In pulling away after spotting a trailer on the car, the tractor automatically lifts the hitch to a positive connection with the trailer kingpin. In backing beneath the trailer when picking up, the tractor releases the plungers, allowing the hitch to retract and the kingpin is secured to the kingpin plate. The only personnel needed on the ground is one man on arrival or departure of trains to lower and raise the bridges between the cars.

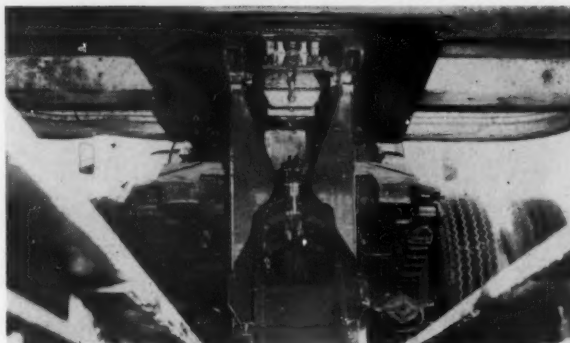
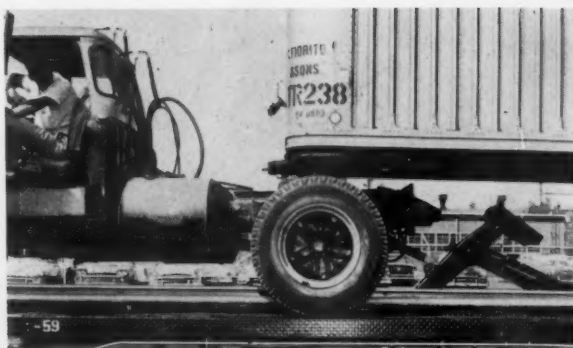
Because of the center and self-aligning features inherent in the Clejan loading system, successful tests have been made in which the tractor operators have loaded and unloaded trailers without touching the steering wheel.

The G-85's hitch retracts below the car's center sill, permitting containers equipped with flanged rollers to be loaded without interference. Containers are secured by clamps which are integral with the shock absorbers. Some 10 in. of movement in either direction at each tie-down is provided. The hitch construction has provisions to compensate for trailers of various heights. In tests, the G-85 hitches have safely withstood impact tests of 9½ mph without damage to trailers or lading.

Roads which have a high piggyback volume and extensive terminal facilities can achieve faster loading and unloading by equipping trailers with Cle-



When attached to this hitch, trailer can move up to 22 in. Device is locked in raised position as tractor moves away after loading.



Hook on tractor raises hitch into position (top); jaws locking the king pin are opened by tractor and close when hitch is upright.

jan dollies. Trailers would then ride to their tie-down spots off their own wheels with the dollies rolling on the car's center sills. Use of the dolly means no wear or scuffing of the tires, and saves trailer wheel bearings since the trailer rests on the dolly wheels in transit. However, the car can take any trailer without any special attachment.

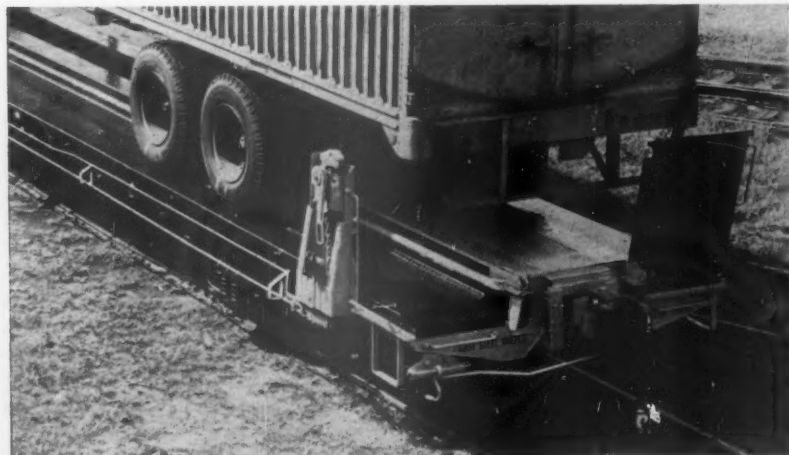
The G-85, with a lightweight of 60,000 lb is some 10,000 lb lighter than other 85 ft piggyback cars and has a

payload capacity of 150,000 lb. The car is built to international standards, permitting full interchange of cargoes. The extra-wide catwalk bridge is of monocoque construction. The two center sill I-beams are 39 1/8 in apart to correspond with the standard width between trailer wheel axle springs and is the same on all Clejan cars. Between the I-beams are the tie-down and shock absorber devices. The standard has two sets of each. Trailers

ride 6 to 8 in. closer to the rail because of the center sill construction. There are no side rails to limit trailer width. The center guide principle permits loading of wider than normal trailers, and also provides for easier backing of non-Clejan trailers along a string of cars than do side guides.

The 85 ft all steel car is a companion to the new Clejan car introduced by GATX in early 1959, and now designated as R-85. Other lengths can be furnished. The R-85 will continue to be offered as an economy model. The G-85, like other Clejan cars, will carry two 40 ft trailers or containers, or four 20 ft containers if equipped with proper flanged rollers. If an extra tie-down is added, the car will handle three 27 ft trailers or containers.

According to W. J. Stebler, General American's president, experience has shown that with the growth of piggyback volume, need for even more rapid loading and unloading becomes necessary. He points out that the G-85 anticipates this need through the use of a dolly and centering device permanently attached to the ramp. This centering device automatically guides the trailer and tractor into line with the edge of the car center sills.



End construction of car emphasizes Clejan center sill design. Extensions from center sill make possible the loading of Clejan trailers and containers. Conventional trailer bridges are located on opposite car corners to make possible loading of standard trailers which move over runways between center and side sills.



Soo Line locomotives operate through weather rated by EMD as the most severe in the U.S. Winterization makes possible reliable operation.

Winterizing GM Locomotives

SUCCESSFUL WINTERIZATION permits a locomotive to operate in any temperature and through all snow conditions. Electric moisture grounds must be prevented, operation of the power equipment in general must not be adversely affected and train steam heating must be maintained.

General Motors attributes successful operation of its locomotives under the most severe winter weather con-

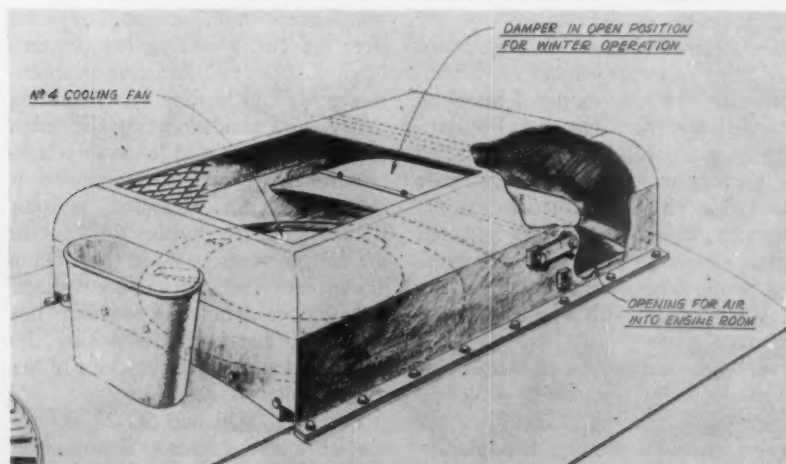
ditions to a cooperative effort on the part of railroads, Electro-Motive and vendors. Many winterizing problems exist today; and EMD is actively investigating these not only on current production models but on the older locomotives.

Changes required to make a locomotive fit for winter operation are not common for all railroads. Winterization problems of the Great Northern,

Northern Pacific and Soo Line are considered to be the most severe in the United States. EMD modifications and extras are designed to permit locomotives to operate under these conditions. However, these schemes are flexible and enable locomotives to operate in winter weather ranging from mild to the extremely severe.

Locomotives operating under extreme weather conditions present problems in preventing snow from entering the engine room and in maintaining temperatures there which will not adversely affect the operation of equipment. For example, an F7 locomotive operating in eighth throttle position has an engine room air intake requirement of approximately 16,000 cfm. Snow eliminated from this air flow to the engine room helps prevent electrical failures due to moisture grounds and also eliminates safety hazards to operating personnel. Maintaining a moderate engine room temperature minimizes freezing problems and tends to eliminate possible sluggish action of electrical control equipment.

During average snow conditions, the heaviest snow concentration is un-



Air is best introduced into the engine room through the roof. Roof intake is located over the No. 4 cooling fan of the road locomotives; over No. 3 fan on general purpose units.

air into the engine room over the engine governor. A deflector directs the air over the top of the engine. The standard cooling fan sequence is normally used. No fan or shutter blanking plates are necessary with the hot water cab heating system. When the roof air intake is set for the winter operation, as many carbonyl filters can be blocked off as required.

Minor moisture grounds, which are not normally harmful, frequently cause ground relay action because the relay is too sensitive. These difficulties can be minimized by slightly increasing the ground relay pick-up value. Present production locomotives have this increased setting.

Maintaining proper engine cooling temperatures contributes to longer service life of the engine and better efficiency. In winter it helps maintain a warmer cab. Where engines are operated at light loads for extended periods, some type of automatic control may be necessary to obtain the desired temperatures. Satisfactory results can be obtained through the application of an engine coolant by-pass valve, automatic shutters on certain models not equipped, or blocking off a portion of the air for the cooling of radiators.

A thermostatically controlled water by-pass valve is available for switcher and transfer locomotives equipped with continuous cooling fan operation and operating at light loads in cold weather. The valve is applied in the water line between the engine coolant outlet and the cooling radiators. If the coolant water from the engine outlet is below the normal operating temperature, the water by-passes the radiators. A drain is provided to automatically drain the radiators when they are by-passed. When the engine reaches the proper operating temperature, the by-pass valve closes, allowing the cooling water to flow through the radiators.

Automatically controlled shutters can be applied to all models of locomotives. The shutters are electro-pneumatically operated and thermostatically controlled. Automatically controlled roof shutters are available

for switcher and transfer locomotives. A special automatic temperature control can be applied to FT locomotives by applying automatically controlled fan clutches. A special cooling fan motor overload protection can be applied to F3, F7, GP7 and SD7 locomotives and is considered desirable on units operating under extreme snow conditions. This arrangement prevents the cooling fan motors from overheating if the fans are clogged with ice and snow.

Fuel Oil

Difficulties may be experienced with fuel oil congealing on locomotives operating in cold areas. Fuel flow can be affected through the system, especially through the suction filters where wax deposits plug filtering elements. Either a low pour point fuel must be used or some provision made to maintain the fuel temperatures approximately 10 deg. above the pour point.

The fuel entering the filters should be maintained above freezing temperatures if the moisture content is high. It should not be necessary to insulate fuel tanks if a fuel of relatively low pour point is used (not necessarily a premium fuel), or if the fuel is pre-heated before it enters the filters. The fuel return line from the engine should discharge into the tank near the suction line. This keeps the area around the suction line free when the fuel is in a cloud stage and the wax crystals are in suspension. On all locomotives except some of the earlier models, the return line discharges into the tank near the fuel suction line, and it is advisable to relocate the return line on these earlier units. Fuel lines should be lagged together where possible to help retain heat.

There are several means of heating

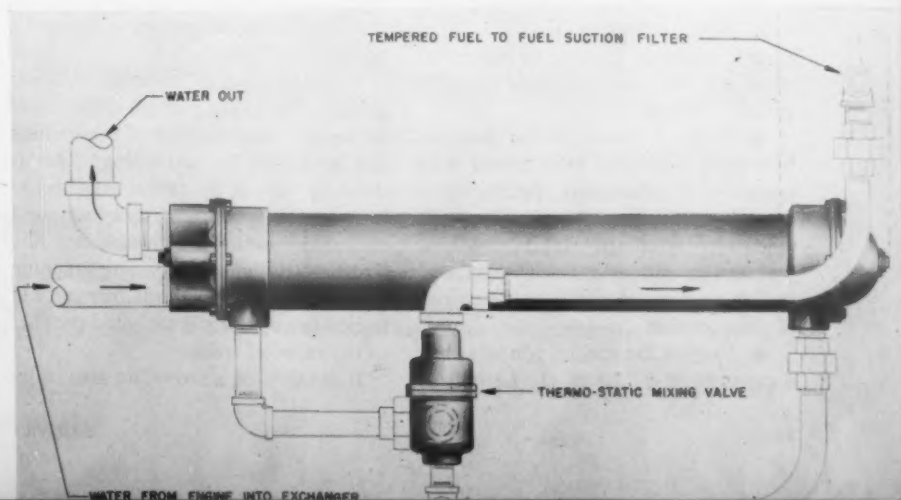
the fuel. The re-circulating fuel oil system is a simple means of getting warm fuel to the filters and is adaptable to all locomotives. The system consists of a small storage tank mounted on the engine with a thermostatically controlled mixing valve and a shut-off valve. The shut-off valve permits the system to be cut in or out depending on the season. The mixing valve opens when the fuel oil temperature falls below 65 deg F, permitting the warm return fuel from the engine to mix with the cold fuel from the main tank. The small storage tank contains a float valve which maintains the fuel level and provides a seal to prevent the fuel pump from drawing air should the fuel supply get too low.

A tube and shell heat exchanger is also available which utilizes engine water for heating the fuel oil. With this heat exchanger, a thermostatic mixing valve controls the fuel temperature to approximately 125 deg F maximum temperature. This heating arrangement is especially suitable where higher fuel temperatures must be maintained when using high pour point fuels.

A special fuel strainer replaces the standard filter element in the fuel suction housing whenever a fuel oil heat exchanger is applied on locomotives not originally equipped. It has a very fine mesh screen which provides an extended surface for the fuel to pass through, reducing restriction and clogging through the housing.

A combination fuel and boiler water tank, with the warm water section surrounding the fuel section, was designed for the E8 units. With this tank, it should not be necessary to apply any additional heating to the fuel system. Problems involved in winterization of steam generators will be discussed in the second installment.

Tube-and-shell heat exchanger uses engine water to heat fuel oil. Thermostat valve controls fuel temperature to a maximum of 125 deg., making possible successful operations during winter.





Large capacity of these chip gondolas is evident when they are compared with standard hopper cars at left. Wood chip business grew rapidly.

Big Gondolas Move Chips on Southern

Special cars are turning an expanding business into a money-maker for the railroad; shippers are also satisfied

An ultra-high-sided gondola will be the standard car for transportation of wood chips on the Southern Railway. After some experimenting, the road has adopted a car design which is proving attractive for shippers and remunerative for the railroad.

For shippers the 6,800 cu ft car is making possible lower freight charges under a special incentive tariff, and means the handling of only two cars in place of the five formerly necessary to do the same job. Improved transportation is making it possible to convert once useless waste wood into a basic ingredient for paper and pulp manufacture, conserving natural resources.

Evolution of the special chip cars was a four-step process:

- Standard 70-ton hopper cars were rejected because their capacity is only 2,678 cu ft.

- Fifty of these 70-ton hoppers had their sides and ends raised with special 5-ft extensions, producing a capacity of 4,448 cu ft each. The small load (by Southern standards) still makes the movement uneconomical and these cars later will be taken out of chip service.

- First of the special gondolas has a capacity of 6,750 cu ft. Length of

the car is 49 ft 2 in., inside width is 11 ft, and height is 17 ft above the rail. This overall height means that these cars cannot move without restriction on parts of the Southern system, and led to the design which will be the future standard.

- Modification of the first gondola design with a new gondola having an overall height of 16 ft 3 in., a width of 11 ft and a length of 54 ft 9 in. This arrangement gives a capacity of 6,800 cu ft while producing a car which can be used anywhere on the Southern without clearance restrictions.

For about 18 months Southern operating officers studied the wood chip business in the U.S. and Canada. Many experiments were conducted in the process of designing the car and a method for unloading it.


Two top-hinged, longitudinal doors make up the lower portion of each side of the car. Any number of these doors can be raised for unloading. This is done by bars or by cables attached to lugs on the corners of the doors and operated by small electric hoists. The Southern-designed unloading machine travels along a track made from an old freight car center sill mounted parallel to the railroad track.

It consists of a swiveling arm, nor-

mally held at about 45 deg to the boom. This arm plows the chips into pits which are regularly used for receiving chips from more conventional hopper cars. For final clean-out, a small bulldozer-like blade is attached to the arm.

It was possible to design a very light body for the car. A load of wood chips clings together and will stand vertically with almost no support. Because such a loading exerts practically no pressure on the car sides, it was possible to make them 11-gage steel braced across the top opening with light angles between the top chords. The steel floor slopes slightly from sides to the center sill and is perforated to permit drainage and reduce weight. The 70-ton trucks have roller bearings.

Wood chips in the Southeast are billed on the basis of "units" of 190 cu ft gravity loaded and 172 cu ft if blown in. Standard hoppers carried an average of 14.55 of the 190 cu ft units against 34.37 units for the new car. Load and revenue are up by 136 per cent with the new car. This new design, Southern officers believe, is the most efficient and most economical yet developed for the expanding chip service.



New steels are
born at
Armco

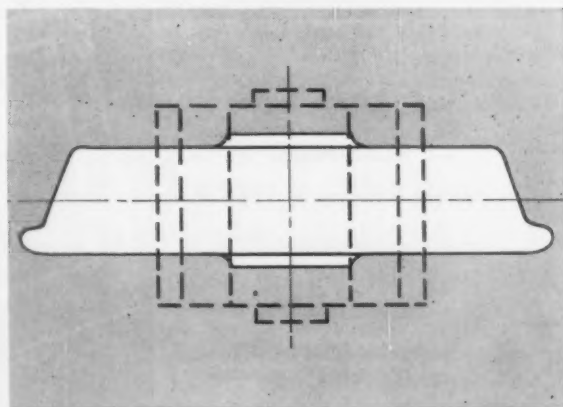
Roll up more miles per dollar with Armco Wrought Steel Wheels

Extra service miles—stubborn resistance to wear, shock, and stress—are worked into every Armco One-Wear Wrought Steel Wheel by forging and rolling.

Tremendous pressures of these two operations obliterate all traces of coarse cast structure. Grains are squeezed together in dense, homogeneous toughness.

Does it pay off? Service experience says, "Yes!" Between 1932 and 1957, Armco shipped more than one million one-wear wheels. *Only six of these have been reported defective.* This is 99.9994% perfect performance!

For price and delivery data on Armco Wrought Steel Wheels, call your nearby Armco Sales Office or write: Armco Steel Corporation, 2509 Curtis Street, Middletown, Ohio.

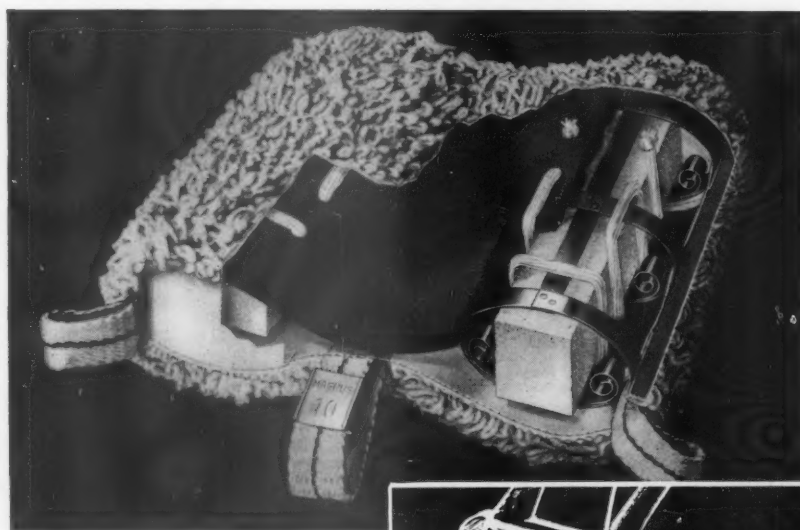


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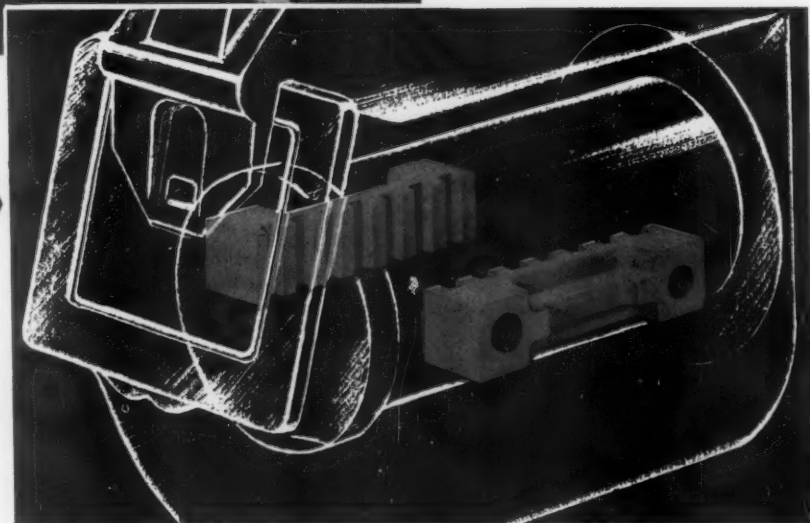
assure an abundant supply and maximum flow of oil to the journal

- three-way wicking
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stabilize the entire journal box assembly

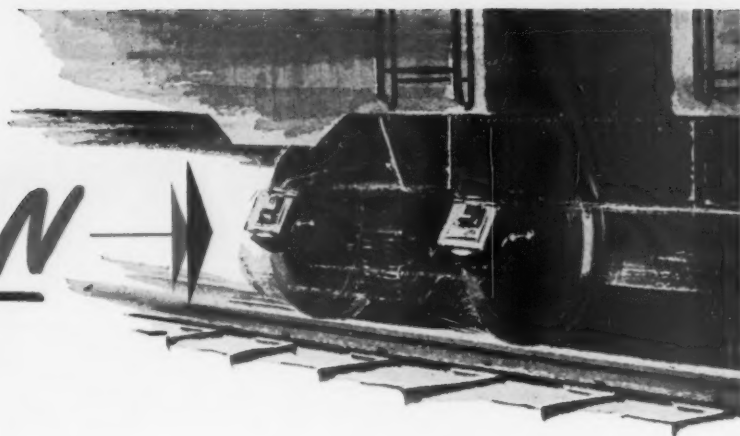
- cut hot boxes 90%
- double bearing life, lower maintenance costs.



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SOLUTION

hot box problem



Magnus Lubricator Pads and R-S Journal Stops offer a low-cost combination that eliminates the principal causes of hot boxes — makes it possible to get the kind of bearing performance you want without sacrificing any of the advantages inherent in standard AAR solid bearing assemblies.

Now you can greatly increase bearing efficiency and cut overall costs, too. You can get up to 5,000,000 car miles per road failure of a bearing at the same time you cut the maintenance and service attention required. Best of all, you can do this at a price you can afford to pay — right now. You increase new car costs only 1.25% — and reduce car maintenance costs over 10% — get your money back in less than 3 years. Here's how:

Step No. 1 — Magnus Lubricator Pads — In the Magnus pad you get all the known best qualities of pad construction in a sturdy one-piece twin-lobe design. There's 3-way wicking (circumferential, internal and center feed) from an abundant oil supply. Each pad holds more than 2.5 times its weight of oil — better than 5.9 pints for the 6" x 11" size. Thoroughly tested elliptical steel springs, completely enclosed and firmly connected, eliminate sponge-type uplift media — assure constant contact of the pad with the journal. Polyurethane cores feed oil to internal wicks and increase the oil reservoir supply, internal wicks are not entrapped — are readily cleaned through normal reclamation process. The cover is heavy pre-shrunk duck, tufted with premium quality cotton yarn and backed by high-capillarity felt. In all, it's a lubricator pad designed by bearing experts to give you the performance you want and need.

Step No. 2 — R-S Journal Stops — Engineered and pioneered by Magnus, R-S Journal Stops stabilize the entire

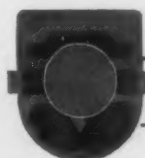
journal bearing assembly — give the bearing a chance to work at optimum efficiency. They double bearing and dust guard life, will make possible the development and application of a low-cost rear seal. They are a must to get the maximum safe period between re-packs.

R-S Journal Stops keep pads in proper position at all times. Misalignment is just impossible. By restricting axle movement they prevent pad compression, too — will make longer pad life possible, and reduce pad dependence on resiliency to maintain journal contact. You get constant uninterrupted wicking — and when used with the Magnus pad that means the maximum flow of oil to the journal.

Yes, with these two Magnus developments you can get the best in bearing performance *at the lowest possible cost*. And you still have all the advantages of standard AAR solid bearing assemblies — ease and simplicity of maintenance, complete interchangeability (with parts available and applicable at any point on the railroad), highest load and speed ratings, light weight, and all the many others.

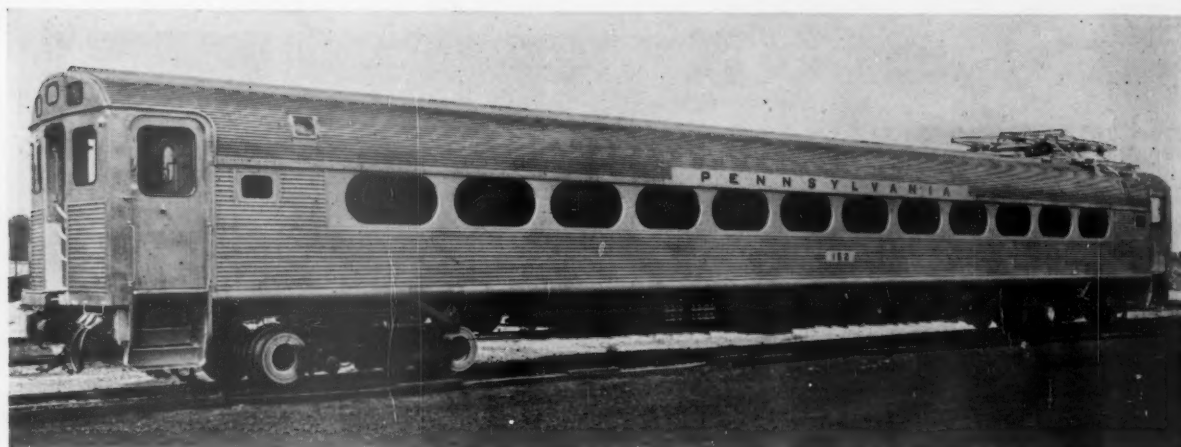
Ask your Magnus representative to give you details on the Magnus pad and the R-S Journal Stops. Or write to Magnus Metal Corporation, 111 Broadway, New York 6, or 80 W. Jackson Blvd., Chicago 4.

MAGNUS



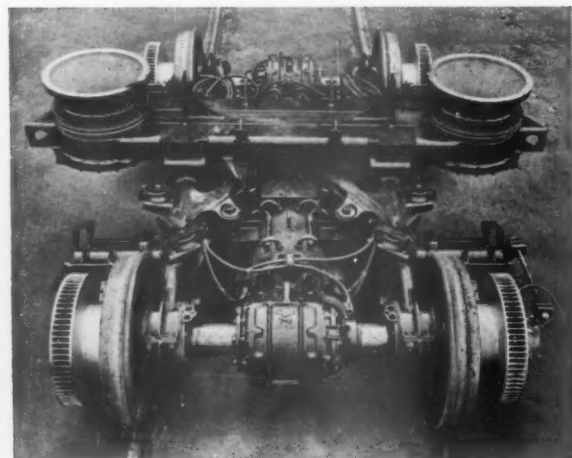
SOLID BEARINGS
R-S JOURNAL STOPS
LUBRICATOR PADS





Spicer Traction Motor Drives Propel The Pennsylvania's Train of Tomorrow

The "Pioneer Suburban", a new 89,300 lb. electric MU car developed by The Budd Company, may prove to be the answer to the Pennsylvania Railroad's challenge for a faster "commuter train of tomorrow." Six of the cars . . . all propelled by Spicer Traction Motor Drives . . . are now serving the Philadelphia suburbs.



Weighing only 23,625 lbs. per pair, Budd Pioneer III type trucks employ two Spicer Traction Motor Drives. These lightweight fabricated trucks have inside frames and bearings and outside disc brakes. Air springs support the car body.

But, it's the compact layout made possible by Spicer Traction Motor Drives that will amaze you! All the cars have inboard frames and bearings and still there's plenty of room to spare. Thus, by employing straight axles, you're free to offset the drive for a multiple gauge design.

Just select the gear ratio . . . from 5.88 to 1 up to 8.9 to 1 . . . that gives you the acceleration you want to match your ideal schedule. Spicer will deliver the complete drive assembly all ready to be secured to the axle without the need of further adjustment.

That means the gears are matched and aligned, then lapped-in under load at the factory . . . to insure the quietest operation for a lifetime of trouble-free service. Finally, the set is lubricated and the housing sealed against leaks. As a result, railway passenger cars equipped with Spicer Drives have traveled up to 1,500,000 miles before needing a major overhaul.

It's simple and easy to use Spicer Traction Motor Drives because you avoid the divided responsibility that comes with a unit that's collectively supplied by a gear manufacturer and a housing fabricator. One call—to the Spicer Service Representative—will bring you the complete help you need and want.

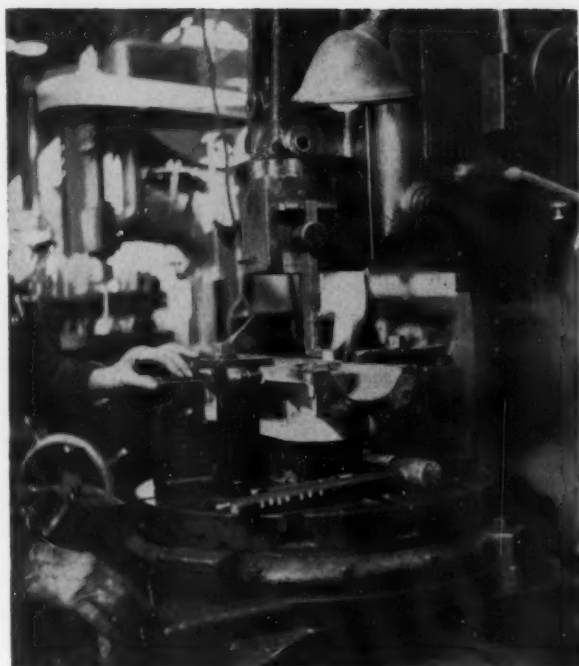
Now's the time to plan cost and weight savings with maximum efficiency through Spicer Traction Motor Drives. Write today for the latest Spicer Technical Bulletin.



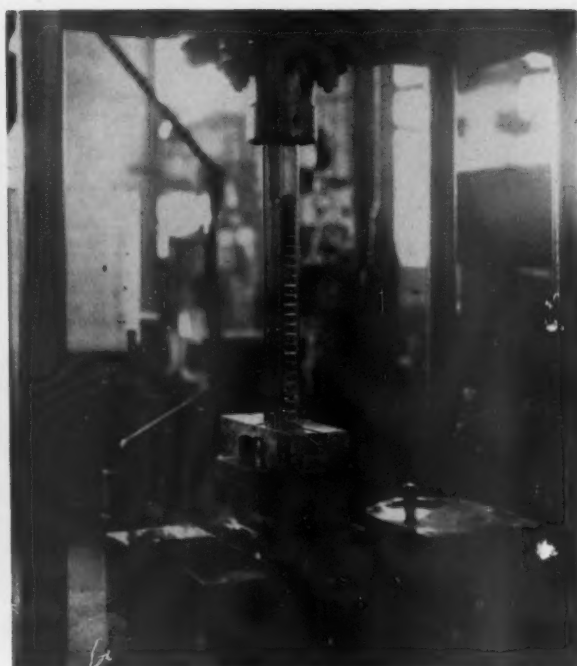
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Slotting enlarges the original slot in the crosshead casings, getting down to clean metal for subsequent welding.



Broaching produces slots for longer cam roller pin. The No. 2 broach is used for this finishing operation.

MP Repairs Crosshead Casings

The Missouri Pacific at its North Little Rock, Ark., shop has developed a method of repairing Alco crosshead casings. The slot in the crosshead guide which takes the cam roller pin of the fuel pump crosshead assembly sometimes breaks out, allowing the crosshead with the cam roller to turn and damage the camshaft.

In the first operation of this cross-

head repair, the slot is rough cut with an additional 1/16 in. on a side taken to insure complete weld coverage. The area is then heated to about 900 deg F and the slot is built up with No. 27 bronze. The No. 1 broach is then used to make the hole a perfect circle. This is followed by the No. 2 broach which cuts an additional slot opposite the one filled with bronze.

This makes two slots available for a new cam roller pin which is 1/4 in. longer than the original type. The No. 1 broach is then put through, removing the burrs caused by the slotting operation. Finally, a reamer is run through the air and exhaust crosshead guides to remove any distortion caused by heating the casing. The casings are then ready to go back into service.



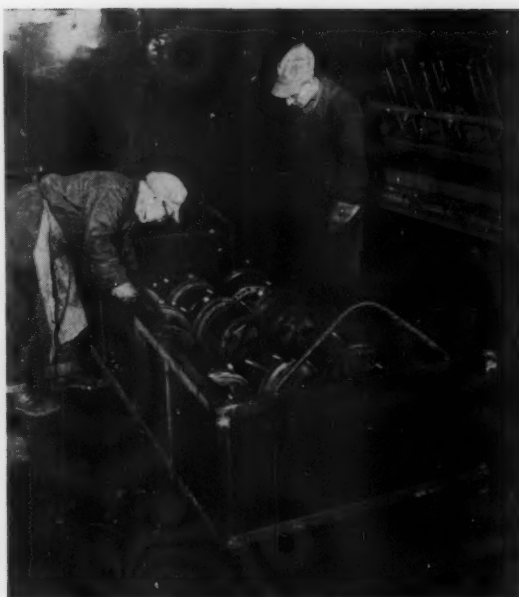
Casing is preheated before the bronze is applied to build up the original slot.



This No. 1 broach produces cylindrical guide for movement of fuel pump crosshead.



Fuel pump crosshead gets long cam roller pin to engage both slots in repaired casing.



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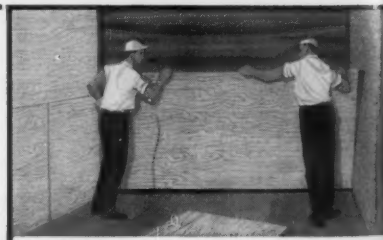
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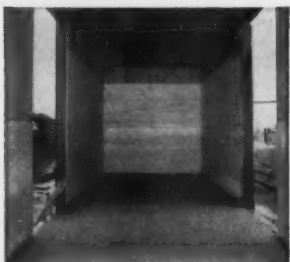
helps S. P. boxcars fast!



Labor time averages 8 to 10 hours per car, including preliminary framing, relining, cement coating floor.



Air operated stapling guns fasten plywood securely over old lining. Idea is new, works well, S.P. reports.



Re-lined cars have clean, smooth walls that can't snag fragile loadings such as bagged sugar or flour.

New method of stapling fir plywood over damaged lumber lining permits Southern Pacific to upgrade B and C cars to Class A carriers in only one-third the time and half the cost.

SOUTHERN PACIFIC has opened the throttle on one of the biggest car modernizing programs in its history. Work on over 400 cars is proceeding at a good clip and at remarkably low cost at the line's big West Oakland and Roseville (California) yards.

Credit for the outstanding speed and economy with which the job is being done is credited to a new technique; stapling big sheets of Exterior plywood over the old lumber lining.

The method takes only about one-third the time normally required for relining a car with T&G lumber—and cuts total costs just about in half. A big factor in the savings is that the old lining does not have to be torn out, as would have been the case in a lumber re-lining job.

The job is done by a two-man crew who tack panels in place horizontally so that two 4-foot wide sheets make up

the required eight foot height. Since most cars are a bit over 17 feet from door frame to end, one 8-foot and one 10-foot long panel cover each course. Vertical joints are staggered. Then two more men follow up for finish stapling, shooting fastenings every six inches around panel edges and over vertical posts spaced 20 inches apart.

One of the chief advantages of the plywood-stapling method is that cars are out of service for a very short time. Beyond that, it's the best and most economical way of doing the job. But the payoff is in the more valuable loadings which can be carried in a Class A car, and it is often enough to pay off the entire upgrading cost in a single long run.

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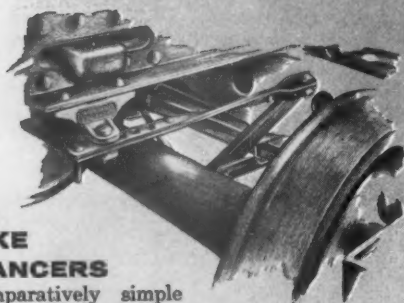
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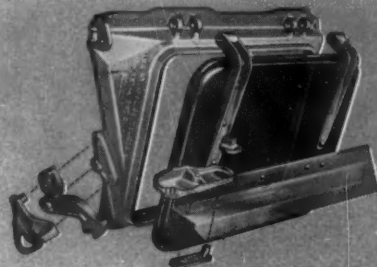
The nation's railroads are noted for many great transportation achievements . . . one of the most important being the efficient handling of the country's heavy bulk freight.

Since 1912, The Wine Railway Appliance Company has designed and manufactured many of the important parts of hopper, gondola, flat and box cars that make this handling function possible, as well as profitable, for the owners and users of the cars. In the years ahead, Wine will continue, through its experience, engineering know-how, and manufacturing skills, to keep pace with the needs of the railway industry.



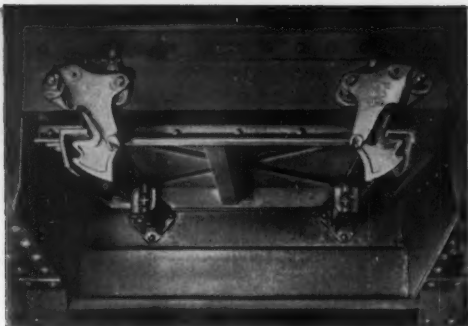
BRAKE BALANCERS

A comparatively simple method of equalizing forces and "balancing" the conventional brake arrangement by replacing the dead lever connection to the truck bolster with the Wine Balancer—connected to the car underframe. A bracket and connector at each end of the center sill flange, engaging the dead lever, balances the brake forces by returning them to the underframe of the car.



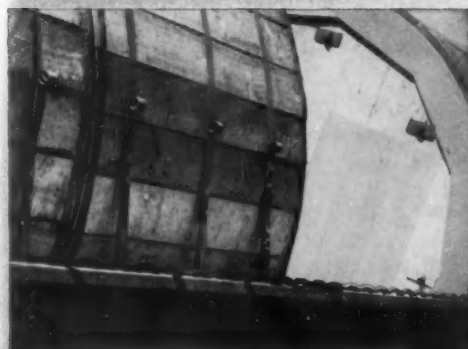
CORRELATED HOPPER UNITS

The one-piece, cast steel frame unitizes each individual hopper into a structurally sound, functional assembly which assures positive door fit. The adjustable locks, cast steel hinges, and symmetrical tapered door flange make possible the *only* adjustable door fit permitting compensation for wear or common irregularities of construction. "Balanced" unloading is assured by dual door operation and a method of controlled flow.



DROP BOTTOM SPRING HINGES AND ADJUSTABLE LOCKS

Drop Bottom Gondolas equipped with these two Wine products provide the shipper and receiver of the lading with a positive closure and afford a fast, economical one-man operation, with selective single or multiple opening of doors.



CONTINUOUS LADING BAND ANCHOR

Wine's continuous offset bar for top-coping applications provides a secure anchor for lading bands every 7½" of its entire length. Permits the use of all types of banding material.



ADJUSTABLE HOPPER DOOR LOCKS

The adjustment feature allows compensation for construction differences and readily permits adjustments necessitated by wear. Wine Adjustable Hopper Locks are adaptable to built-up, structural hopper openings as well as cast steel frames.



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Share your knowledge, W. T. Rice, president of the Atlantic Coast Line, told those who attended the annual Coordinated luncheon.

Faster Freight Service Poses New M/E Problems

Coordinated meetings consider impact of today's competitive situation on the operations of railroad mechanical departments

Objective and revolutionary thinking in design and operation of railroad equipment and services is necessary to solve major portions of today's railroad problem, W. T. Rice, Atlantic Coast Line president, told last month's Coordinated Mechanical Associations meeting. "We cannot expect the developments of our predecessors to continue solving our problems today," Mr. Rice warned. "Each of us must find new ways of doing the job and be willing to share our knowledge with our colleagues in the industry, such as you are now doing in your sessions here in Chicago."

Over 5,000 are estimated to have attended the three days of meetings conducted by the Coordinated Mechanical Associations and the four-day exhibit of the Allied Railway Supply Association. Registrations by the ARSA, Air Brake Association, Car Department Officers Association, Locomotive Maintenance Officers Association, and Railway Fuel and Operating Officers Association totalled 3,311 men and 891 ladies. Another

1,000 shippers and railroaders inspected the 37 freight cars displayed by suppliers in the ARSA track exhibit area four blocks from convention headquarters at the Hotel Sherman.

Problems to be solved by railroaders, as summarized by Mr. Rice at the annual Coordinated luncheon, are development of a transportation plant physically capable of rendering the service required by the shipper and receiver of freight today, and establishment of a better public relations program to make more friends for the railroads. "Gone is the age," said Mr. Rice, "when the American railroad man could exist in a vacuum, as far as the general public is concerned, and expect business to continue to come to the rails."

New employee attitudes must be fostered by supervisors, O. L. Zimmerman, vice-president, operations, Illinois Central, told the RF&OOA meeting. "You interpret the policies, philosophy, objectives and operations of the companies you represent. We are coming to a period that will be a

time of decision for the railroads . . .

"We are determined to wipe out featherbedding. If we do not, we might as well give up and let the railroads become government property, as they are almost everywhere else. This is our fight to make the railroads of the future stronger—railroads that make good profits; railroads that have money to invest in new and better tools; railroads that can hire more employees because they are doing more business," Mr. Zimmerman said.

The perennial hotbox problem received attention from Mr. Rice. "Nothing is of greater importance to our train operation," he said, "than solution of the hotbox, with resulting train delays and derailments. You have a terrific challenge, both as manufacturers of railroad equipment and as mechanical experts, in continuing an aggressive search for the answer to this oldest of railroad problems."

"Railroads cannot live with the waste pack box," W. M. Keller, AAR vice-president-research, told CDOA members. There is neither the manpower nor time to make possible its successful operation in today's railroad picture. Currently, 38.6 per cent of the car fleet is on journal pads. Cars with pads can operate 500 to 600 miles without attention," according to the AAR vice-president.

While initial attention was given to the lower half of the journal box, the AAR is also working on the upper half. Mr. Keller pointed out that radial wear almost never condemns bearings—in most cases it is end wear.

(Continued on page 47)



K. H. Carpenter, DL&W, presiding at CDOA, was succeeded for 1960 by J. F. McMullen, Erie. CDOA registration was 489.



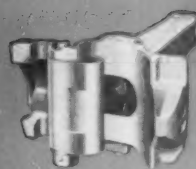
W. E. Lehr, LV, (left) took over as LMOA president from E. V. Myers, SLSW, after elections. LMOA registration was 685.

Any way you look at it...



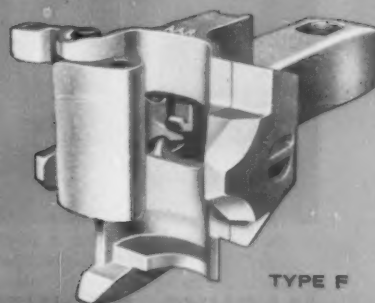
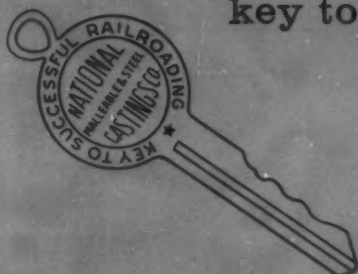
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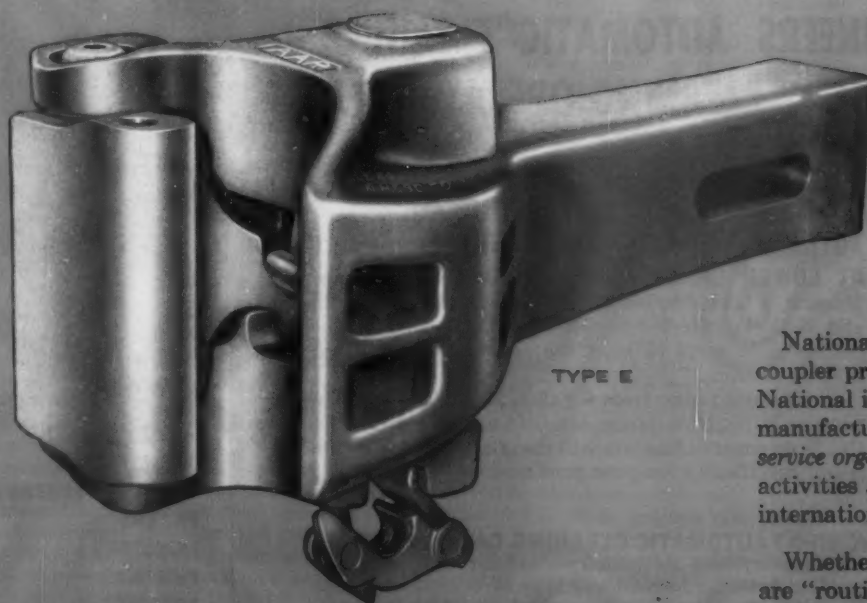


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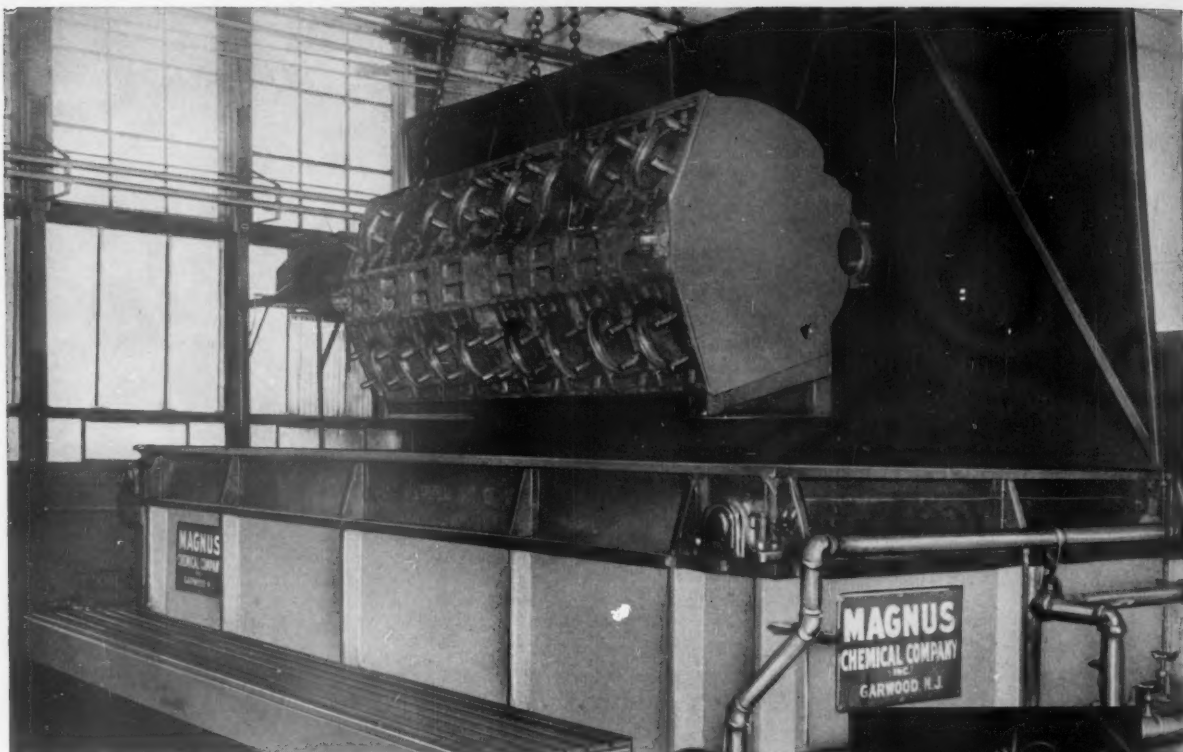
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A WORLD-WIDE ORGANIZATION SPECIALIZING IN THE CLEANING AND PROTECTION OF ALL SURFACES.

Coordinated Mechanical Association Meetings

(Continued from page 44)

Greatest end wear is at the fillet end, with only "moderate" wear occurring at the fillet end. The AAR will soon have information on its new bearing design which will even out the end wear and will give better radial loading through a new back arrangement.

Commenting on criticism of the AAR controlled clearance bearings, Mr. Keller pointed out that, after sufficient operation, all bearings become "controlled clearance." During the interval in which this fit is developing, there is great risk of bearing failures. The aim was to eliminate this initial "horse collar" fit.

H. H. Clark, Erie's superintendent

of transportation, said that it is time "to get on with our rule making" in piggyback. The volume and problems associated with the rapidly growing business require rules for trailers and cars generally in the nature of the present car service, per diem, and interchange agreements for other rolling stock. Primary problems are those of settling for trailer and lading damage and of preventing such damage through proper loading and through adequate securement of trailers on cars.

Mr. Clark said it is too soon for standardization in piggyback, but the number of tire sizes, trailer brake systems, and electrical components

should be minimized. He pointed out that a fully loaded trailer on a car with a 42-in. deck almost always has a center of gravity higher than 84 in. Actually, such movements are restricted by present interchange rules, and this discrepancy should be resolved.

Throughout the meetings, mechanical officers considered methods for achieving more economical locomotive operation and maintenance, studied problems accompanying the introduction of new types of freight cars and car repair methods, and discussed ways for handling and controlling the high-speed freight trains which are becoming the accepted standard for today's operation.

A series of important reports and discussions from the 1959 Coordinated meetings follow.

Piggyback Problems Are Growing

Need for agreements covering trailer interchange and trailer damage settlements are of primary importance, H. H. Clark, superintendent of transportation, Erie, told a CDOA meeting on piggyback. A panel discussion of piggybacking confirmed these opinions and indicated that responsibility for, and settlement of, trailer damage would break down in three areas:

- Trailer owner responsibility—Ordinary wear and tear; or service hazards;
- Handling railroad responsibility—Unfair usage while in possession of handling railroad;
- Highway damage—Accidents on highway resulting from negligence of tractor driver.

H. H. Schuette, assistant superintendent car department, Erie, indicated that mechanical people should be concerned over the loading methods used to insure safe movements and to prevent damage to lading. He said that loading rules are needed. The driver may be the only one to see the method of stowing cargo in a closed van, yet subsequent responsibility rests with handling carrier. This is complicated, Mr. Schuette said, by the fact that many trailers are not sufficiently strong for rail movement—either because of original design, or because of subsequent deterioration in service. It was indicated that the B&O and B&E inspect closed trailers when delivered to their loading ramps. H. L. Hewing, superintendent of interchange, Chicago Car Interchange Bureau, said he would break seals on closed trailers to examine the lading and assure safe and damage-free movements. An AAR representative said he is encouraged by the low damage claims resulting from piggyback movements.

Most railroads have difficulty in keeping jacks and chains on cars equipped with these tie-down devices. J. H. Long, chief mechanical officer of Trailer-Train, said his organization has 200 cars fitted with this

tie-down arrangement. Most TTX cars have trailer hitches which have been very satisfactory and required a "minimum of repairs".

Mr. Long said original TTX cars for handling two trailers were 75-ft. units for the 35 ft. vans. Next it was necessary to buy 85 ft. cars for moving two 40 ft. trailers (RL&C, May 1959, p 23). Now some states allow 45 ft. trailers. Mr. Long stated that it would be difficult to build a single car capable of handling two of these trailers.

Terminal Brake Tests Take Time

Initial and intermediate terminal air-brake tests take substantial time, and much of this is governed by the facilities and the manpower available, a CDOA committee reported to a joint ABA-CDOA meeting. Elimination of excessive leakage is of primary importance, but proper brake operation and proper piston travel must also be assured. The committee said that all possible work must be done to cars while they are on repair tracks where facilities are available.

All railroads must take action to insure complete compliance with In-Date-Testing requirements, the committee stated. Sufficient single-car test devices and trained men are essential.

To improve and speed brake inspection and maintenance, the committee suggested the following:

- Inbound inspections be made to detect improper piston travel before car brakes have been bled off;
- In adjusting piston travel at repair tracks, go to bottom rod and leave at least 2 in. take-up available in slack adjustment devices.
- Improved yard air lines can facilitate train charging.

An approach to this was discussed by H. B. Wolfe, Santa Fe engineer of car construction. The AT&SF is operating articulated piggyback cars. Two 44 ft 6 in. units are joined by a swivel-type draw bar which is commercially available. The ICC took "no exception" to this design which it was submitted. The Nickel Plate submitted a similar arrangement and, when it could not get ICC "approval," abandoned the idea. It was pointed out that in neither case had the arrangement been disapproved by the Commission. Mr. Wolfe said that a deck height of 3 ft 5 in. or less is desirable for piggyback cars.

The following actions have been recommended to the AAR by the CDOA: (1) allow fair charge for performing IDT work; (2) make the application of automatic slack adjusters mandatory on all new cars and those freight cars receiving 100 man-hours of repairs.

Commenting on the frequency of the IDT work, T. H. Bickerstaff, AT&SF, said that AAR brake committee had sought intervals three times that finally set by law. J. Russell, NYC, said that there really is no 90-day requirement for the single car test. If a car is in good enough condition to stay off repair tracks, Mr. Russell said, it can run up to a year without In-Date-Testing.

C. Kimball, Southern, said that his road's inspectors check piston travel on incoming trains and tag cars with color-coded cards, indicating if travel is up to 1-in. over maximum permissible, or if it is greater than 1 in. The inspector then has a data sheet showing what the effects of applying brake shoes and making adjustments in rigging have on the piston travel. This work is done without air on the cars and is finally checked on the outbound air-brake inspection. (Over)

Automatic Fueling Has Advantages

A new LMOA committee—that on New Developments in Motive Power Maintenance, reported on automatic fueling and eight other developments.

Advantages of automatic fueling are: (1) saves fuel; (2) speeds fueling, reducing locomotive delays; (3) reduces fueling man-hours; (4) makes fueling area cleaner and safer; (5) reduces fueling area maintenance; (6) assures filling of tank to proper level, and (7) minimizes need for oil separators at fueling stations.

To be acceptable, automatic fueling systems must be compatible with present systems so operation will not be drastically affected during conversion. The cost must be reasonable. Systems must be suitable for use both with high-capacity, high-pressure and smaller-capacity fueling pumps. These systems must prevent leakage and spillage when fueling and while connecting and disconnecting the nozzle. Each system should be compatible with other systems so fueling will not be hampered when a diesel with one type is serviced on a road using another type.

This compatibility requirement was stressed during the discussion. It was believed that the systems of the several manufacturers should be standardized to the extent that the fuel tank connections would be interchangeable.

Another recent development is the use of epoxy material to prevent the entrance of moisture in traction motors. The life of epoxy treated motors has not been fully evaluated, but tests have proved the material to be effective in combating moisture. Its use has been extended to traction generators and auxiliary equipment.

The use of glass banding in lieu of steel wire banding in electric traction equipment has been undergoing extensive tests. The process consists of the application under tension of a treated glass tape followed by curing of the tape which must have parallel fibers. Glass banding eliminates the possibility of a flashover breaking one or two strands of a steel band with resultant motor damage. It is anticipated that the service rendered by the glass band should be superior to anything used to date.

A conversion injector kit is available that can be applied with only minor modifications to the standard EMD unit injector. Several roads are conducting tests to find out if the converted injector will reduce fuel consumption when the engine is burning distillate and heavy fuels. There are reports of fuel savings of 19 per cent at idle and up to 8 per cent at full load, depending on the grade of fuel. Users of the modified injector have reported a noticeable decrease in exhaust smoke and sparking. The committee believes the success of tests up to this time warrants further investigation and a complete report next year.

Development of more durable paints and corrosion prevention materials hold promise of reducing carbody and underframe repairs. Tests indicate that acrylic paints, originally made for automobiles, will hold

their luster and be suitable for locomotives. Their cost at present is more than that of lacquer colors.

Railroads operating hood-type units, where snow is prevalent, frequently use salt on walkways to assist in keeping them free of ice. This salt causes severe corrosion and paint damage. A Chicago switching road has mixed a corrosion inhibitor with the salt—2 lb to a 100 lb of salt—and has had a marked decrease in corrosion damage.

A number of roads have experienced many cracked or broken gear teeth on Baldwin units equipped with 362 traction motors. Solutions to this problem which have merit are: (1) the application of a commutator type load regulator, replacing original carbon-stat regulator and a soft-start switch in the air throttle control. This arrangement reduces initial excitation of main generator, permits locomotive to accelerate smoothly, and reduces shocks to gearing. (2) Use of high-strength bonded rubber-to-metal traction-motor nose supports which produce resilience and snubbing action.

Radioactive tracer techniques provide an accelerated method of determining the vari-

ous factors causing wear in diesel engines. The Southern Pacific's tests using this method were described recently (RL&C, Aug 1959, p 33).

Several roads with cooling system problems have installed thermostatically operated control valves between the cooling water radiator and the engine. It circulates most of water through a line by-passing the radiator when water temperature is below 160 deg F, and circulates all water through the radiator when above 170 deg F. A predetermined flow of water is diverted to radiator to prevent freezing when temperature is below 160 deg F. An alternate method is to use a choker type temperature regulator similar to that used in automobiles. This type can cause hot spots to develop in engine block when thermostat prevents circulation of water.

Difficulties have been encountered with aluminum pistons in the Alco 244 engines. The Ni-Resist insert in the upper ring groove improved the situation. A few railroads and suppliers have pioneered cast-iron pistons. Tests have not been run long enough for definite conclusions to be reached, but little adverse comment has been offered. Some roads, because of good test records, consider the cast-iron piston as standard replacement for the aluminum piston. The committee believes the success of the tests warrants continued investigation of these pistons and a full report next year.

Education Corrects Diesel Abuse

Lack of crew education and supervision leads to abuse of diesel locomotives and damages wheels, R. A. Wieand, assistant road foreman of the Pennsylvania, told the Railway Fuel and Operating Officers Association.

The educational responsibilities of road foremen are emphasized because of the rapid changeover from steam to diesel and difficulties in establishing adequate training programs. Habits formed by engine crews during this transition period, some through trial and error, have been difficult to correct, particularly in the electrical field. Some that still exist are:

- Continued application of power with the locomotive stationary, damaging main generators and motors;
- Throttle slamming and pumping, causing the arcing of electrical appliances;
- Overloading the locomotive, resulting in excessive currents;
- Failure to reduce throttle at railroad crossings, causing damage to traction motors;
- Using sand to stop slipping wheels without reducing throttle position;
- Reversing direction of locomotive before coming to a full stop.

The use of a flag stick to push contactors and relays in the high voltage electrical cabinets while under load or at any other time, has not only damaged locomotives but resulted in numerous personal injuries.

Flat spots on wheels are traceable to two factors, mechanical and human. Mechanical factors include the improper adjustment of brake rigging and piston travel. Development of high brake cylinder pressures on

locomotives through improper use of independent and automatic brake valves can cause flat spots and overheat the wheels. Damage can be caused by use of the independent instead of automatic brake to reduce train speeds on freight units in dynamic braking. On some of these units, the brake cylinder pressures have been found to be 45 psi over that authorized.

In yard or switching service, the practice of handling cars without air brakes, relying on the locomotive brake for full stops contributes to the possibility of flat wheels. Tampering with the reducing valve on yard switchers to increase brake cylinder pressure has led to seals on the valve or other means to prevent adjustment. For proper brake operation on switchers, it is suggested that short piston travel be provided and brake rigging be adjusted to allow the shoes to be just clear of the wheels when brakes are in release. This decreases the volume of air necessary to release brakes when using the independent brake valve.

The importance of the engine crew inspecting locomotives when assigned at the initial terminal is emphasized. Defects can be, and are found that would cause delays en route. Hand brakes, which contribute to flat spots, must be checked on each unit. In multiple operation, there will be a slow release when using the independent brake valve and when releasing the automatic brake application by means of the bail on the independent brake valve. The bail must be held down until it is definitely certain that a complete release is obtained on the trailing units particularly when five or six are operated together.

Mechanical Reefer Fleet Grows Rapidly

About 5,000 mechanical refrigerator cars are in service or on order at the present, the CDOA Committee on Mechanical Refrigerator Cars reported. It is necessary that existing service points be enlarged to expedite inspections of these cars, and that the number of such points be increased. As an example, the committee cited one point which formerly inspected and serviced nine cars a week. It is now to be expanded with facilities for 100 cars per week.

Lack of standardization and nomenclature complicates work on interchange cars. An electrician who has been trained on diesel-electric locomotives is lost when he gets a wiring diagram or instruction sheet for a mechanical refrigerator car. Two different wiring codes are involved—that developed by the AAR Electrical Section and the code of the American Society of Refrigeration Engineers.

The committee is asking that terms applicable be standardized so interchange of records and information can be more uniform. The following terms and expressions were proposed to the AAR for standardization:

Fresh Produce Car—A mechanical refrigerator car designed for transporting fresh (non-frozen) commodities only. Refrigeration equipment provides heat or refrigeration automatically as required to maintain car air temperatures at control setting in a range of 20 to 70 deg F. Term would be used in place of "high-temperature car" which is not acceptable.

All Purpose Car—A mechanical refrigerator car designed for transporting either fresh or frozen commodities. Refrigeration equipment automatically provides refrigeration or heat as required at settings of 20 to 70 deg F and refrigeration only at settings of 0 to 20 deg F.

Zero Car—A mechanical refrigerator car designed for transporting frozen commodities at 0 deg F only.

Sub-Zero Car—A mechanical refrigerator car designed for transporting frozen commodities at temperatures below 0 deg F only.

Tandem Compressors—Two compressors driven with separate belts from a common motor.

Direct-Drive Compressor—In mechanical refrigerator car, refers to a compressor connected directly or through a clutch to the engine (differs from commercial refrigeration where this term refers to a compressor directly connected to an electric motor).

Electric-Drive Compressor—An open-type compressor driven by an electric motor through coupling or belts.

Hermetic Compressor—A compressor and electric drive motor built as a unit within a sealed casing; operating parts not accessible.

Semi-Hermetic Compressor—A compressor and electric drive motor built as a unit with accessible operating parts.

Open Compressor—An accessible compressor with the drive shaft extended for coupling or belt drive.

Plenum Chamber—An air duct located in the upper section of the lading compart-

ment for distributing conditioned air.

Envelope Air Distribution—An air-distributing system designed to confine circulated conditioned air around the lading compartment without actual contact with the lading.

Semi-Envelope Air Distribution—An air distributing system designed to permit a portion of the conditioned air to come into direct contact with the lading on its return to the evaporator coil and circulating fans.

Open Air Circulation—An air system designed to discharge all conditioned air directly into lading compartment. Car to be equipped with floor, side and end wall racks to permit free air circulation around the load.

Lading Space—Portion of a car in which the commodity is loaded. Also called cargo space and commodity space.

Machinery Compartment—Portion of car which contains mechanical equipment other than cooling coils and circulating fans.

Traction-Motor Problems Are Varied

The LMOA Electrical Committee tabulated the causes for traction-motor removal on one major railroad. It reported that the following data is approximately the same for several other roads, with the exception of bad-order gearing which varied considerably on different roads.

Causes for removal, in per cent, were: grounded motors, 10.8; shorted or open arm coils, 9.4; throwing solder (overhead), 2.3; bad-order gearing, 10.07; bad-order axle bearing, 5.7; frozen armature bearing, 4.8; suspicion of bad-order bearing, 3.35; 180-deg burns and flashovers, 2.7, and open field circuits, 2.3 per cent.

These account for 51 per cent of motors removed. Approximately 25 per cent were removed because of high mileage, and the remaining percentage for reasons not falling under any particular classification.

In summarizing the report, the committee said in respect to grounded motors that there exists a very urgent need for a better means of insulating the windings, leads, and brush holders in all traction motors, including new motors.

Epoxy resin for use as insulation merits a thorough study, but it is evident caution should be used in selection of this type material because of the numerous types and formulations. If used in railroad shops, the equipment and technique are very important.

Exclusion of moisture is a problem which may be improved somewhat by good maintenance of traction-motor covers, leads, sleeves, and air ducts. The use of cut-out switches on traction motors has proved to be an aid on locomotives operating in snow.

Glass banding of armatures is now accepted in lieu of steel banding. Test cases have been made in elimination of slot wedges, using glass banding in machined grooves cut into laminations.

Commutation problems are due largely to incorrect grade of brush for particular operating conditions. An improvement is solicited for material for brush-holder studs.

Other standardized terms proposed include starter, contactor, relay generator, alternator and humidity control.

The committee reported that hydraulic starters are in service on eight cars and are giving good service. Major troubles occur when proper starting procedure is not followed and the pressure charge is exhausted. Attempts to replace battery charging generators and voltage regulators with a rectifier charging system have not been successful to date, but warrant further work. The nickel cadmium battery in refrigerator cars is reported to operate with less water consumption than the lead-acid battery if the voltage regulator is properly set. This regulator setting is very critical. The committee reported that manufacturers are currently working on the development of equipments and car designs which would not require defrosting. This would eliminate difficulties with defrost controls. The committee has proposed that curves showing discharge and suction pressure under various operating conditions be included in the manuals which are carried on cars under AAR Interchange Rule 2.

Porcelain cracks or breaks due to flashovers. Polyester stud "tracks" and presents a maintenance problem to keep clean. Teflon has been suggested. Extra care in brush holder application and maintenance is recommended. Tell-tale signs indicating vibration should be watched because vibration may cause a serious failure of armature, field windings, and bearings. This vibration may be caused by mismatch or defective contour of pinion and ring gears. Contour gages are recommended for use at all points in an attempt to lessen vibration in motors.

Trapezoidal bearing shows good results, although is comparatively new. Bearing failures have definitely shown an increase where signs of excessive vibrations are found. Grease-sealed bearings are far in the majority, but railroads using exclusively oil lubricated motors report good results.

Extending the period between overhauls of traction motors from the present 400,000 to 500,000 miles to a possible 1,000,000 miles was a major topic of the discussion. Among the means for accomplishing this are improved bearings now available, avoidance of worn gearings, the matching of pinions to gears, closer attention to defective wheels, and support bearings, and other causes of vibration. It is expected that epoxy resins and glass banding of armatures will make important contributions to extended life.

Attention was given to the cause and effect of flashovers. A motion picture presented by Electro-Motive showed the development of flashovers. High-speed motion pictures taken at 6000 frames per sec extended the picture of a flashover from the actual 2/5 sec to 1 1/2 min. It showed that the flashover which appears as a single flash actually consists of a succession of bursts of arc. Such flashovers sometimes burn and release steel wire banding. A method of protecting banding by the use of glass tapes and epoxy resins developed by EMD was also shown in the motion pictures.

(Continued on Page 52)

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Composition Shoe Application Problems

Sound planning is required to obtain the best results in converting from cast iron to composition brake shoes. When composition shoes are properly applied to locomotives and cars, they will give satisfactory braking performance and worthwhile economy, the Montreal Air Brake Club reported to the Air Brake Association. The Association was told of the application of composition shoes to Canadian piggyback cars, lightweight commuter coaches and diesel locomotives. Resulting wheel conditions, noise, and shoe life were reported.

Brake cylinder levers were altered on the commuter cars to reduce the braking ratio from 75 to 33.7 per cent at 50 psi. Poor rail adhesion under heavy snow conditions and heavy braking in normal service caused the wheels to have flat spots around the entire circumference. The braking ratio was further decreased to 30 per cent. Under all rail conditions and despite frequent use of brakes, generally applied to within one-half car length of a stop, the trouble was corrected.

Wheel life with composition shoes has been reported equal to, or better than, that of cast iron shoes, although wheel grooving has been prevalent on commuter cars. This condition was almost eliminated by application of a $\frac{1}{4}$ in filler welded to the brake head to provide a full bearing on the brake shoe. Shoe life is reported to be five to seven times that of cast iron in the same service.

Noise encountered with composition shoes is generally experienced in the last half car length of a stop. In below freezing temperatures, there is less noise than in warm weather. Tape recordings of noise level produced by trains equipped with composition and cast iron shoes showed less noise with composition shoes while running and during braking. The difference in running noise is most apparent on freight trains consisting of piggyback cars equipped with composition shoes and other standard freight cars equipped with cast iron shoes. Some piggyback cars, all with composition shoes, have been in operation since the beginning of 1958 in complete piggyback trains operating in consists up to 100 cars and run on passenger train schedules. No shoes have been removed for wear, and tread contours have remained very close to new wheel contours.

Studies made on all classes of Alco and EMD locomotives showed the braking ratios varied from 56 to 83 per cent based on 50 p.s.i. The apparent reason for this wide spread was the practice of interchanging standard trucks between heavy and light locomotives. Because of the higher and constant coefficient of friction of the composition shoes, a reduction in the overall braking ratio is recommended by the air brake company to the following values: Automatic brake—22 to 28 per cent; Independent brake—40 to 45 per cent; Emergency not over 63 per cent. Braking ratio can be changed by reduction of size of brake cylinder; modification of leverage

ratio; and adjustment of brake cylinder pressure.

On new locomotives, where interchangeability of trucks is not required, the basic ratio is obtained by using a smaller brake cylinder to obtain a suitable ratio for the automatic brake. The independent brake cylinder pressure is raised. When these units were used in multiple consists with units having cast iron shoes, the trailing units with cast iron shoes had wheels lock because of the higher independent brake pressure. This was overcome by using a J1.6-16 relay valve which transmits 100 per cent of the control pressure to the brake cylinder from the automatic brake, and 160 per cent for the independent brake. A standard trainline independent pressure is used and the valve provides the higher brake cylinder pressure required on units with smaller brake cylinders.

Exhaust Sparking Found Serious

The LMOA Committee on Fuel and Lube Oil reported that a recent survey showed American railroads are using approximately seven million barrels of fuel oil per month. This fuel oil is produced by 45 companies at 106 refineries. The committee pointed out that, with 106 sources of supply, it is very important that all fuels be policed carefully. They must be stable and remain stable in storage; they must be compatible with the lubricating oils in use.

After discussing fuel-oil classification, specifications and handling, the committee dealt with the serious fire hazard caused by exhaust sparks. It reported that it is encountered with most types of fuel, but it is more pronounced with the lower grades of fuel due to increased carbon build-up in the exhaust chambers.

Conditions that tend to promote exhaust of larger incandescent particles from the exhaust stacks are as follows: use of lower grades of fuels; bad fuel injectors; low firing pressures due to leaky valves or ring blow-by; prolonged idling periods followed by immediate full-load operation; oil seals leaking on engine blowers; low cooling-water temperature; water leaks into the combustion chamber; fuel-oil additives containing ash; lubricating-oil additives containing ash.

Spark arrestors with screens or netting have, in some cases, reduced the size of the glowing carbon particles being ejected by breaking them up into smaller sizes. This type of arrestor presents a maintenance problem as they must be cleaned periodically to prevent plugging. Now being used is the cyclone type arrestor which is built into the exhaust manifold and streamlines the exhaust gas flow to break up the exhaust particles. Most types are helpful in reducing the number of fires set by the glowing particles, but they will not eliminate this condition entirely.

On older road units and new units of the same class where interchangeability of trucks did not permit the use of a smaller brake cylinder, the braking ratio was reduced by using a J46 relay valve. It transmits 40 per cent of the control pressure to the brake cylinder from the automatic brake and 60 per cent of the control pressure for the independent brake. It was found that the recommended independent braking ratio could be obtained by standard control pressures which enabled satisfactory service in multiple consist with cast iron shoes. Using this method of applying composition shoes, the trucks remained interchangeable with units having cast iron shoes, provided the type of shoes used are changed to agree with the locomotive equipment.

On switcher units, the required reduction of the basic ratio was done by using a J16 relay valve which transmits 60 per cent of the controlled pressure to the brake cylinder from both the automatic and independent brake. If switchers were used in road service, the J46 relay valve would be considered because it is suitable for the No. 6 brake equipment used on these locomotives.

Actual tests have shown that exhaust port deposits containing oily material, such as unburned fuel or lube oil, will glow at temperatures encountered in diesel engine operation. Deposits contaminated with chromate type water conditioner lower the temperature at which the deposit will glow and also increase the glow intensity. Water leaks in the combustion chambers as well as abnormally low temperatures in engine operation have a tendency to loosen the carbon deposits. Metallic-type fuel and lubricating oil additives can cause excessive sparking as the carbon particles will be larger and of greater tensile strength, which will reduce the glow temperature of the particles, causing them to glow or burn. This burning will release the deposits from the stack so they are blown out in a glowing condition. The use of ashless additives is helpful as they do not reduce the glow temperatures of the carbon deposit and, in most cases, the temperature of the exhaust stack is not sufficiently high to ignite the deposits. Soot and carbon deposits will normally ignite at about 1,100 deg F, while the normal exhaust port temperature range is 900 to 1,000 deg F at full load.

There are some additives on the market referred to as "Exhaust Improvers" which, with certain fuels, will improve the smoke, as well as the sparking condition after they have been used long enough to remove the existing carbon deposits from the exhaust passages. The use of additives of this type increases the fuel costs, and their use has been confined to the smog critical areas.

To be effective, the sparking condition must be eliminated in the combustion chamber rather than in the exhaust system by reducing the carbon deposits on the various parts. Flame ceramic coating on the pistons, heads and exhaust valves appears to have considerable merit in reducing the formation of these deposits.

EMD injectors with the needle valve tips are being tested and they show some promise as better injection and a finer spray pattern is produced. The improved piston ring set up with conformable oil control rings will be helpful as lubricating oil consumption will be reduced.

The problem of sparking at the exhaust could be reduced greatly if the suppliers would furnish lubricating oil with organic or ashless additives. Recent tests have shown that lubricating oils with certain additives, particularly calcium additives, have a greater tendency to cause sparking when used with cracked distillate fuels.

Other Fuel Problems

A number of other problems in the use of the lower grade fuels were covered very briefly by the committee.

Some fuels will produce more fuel soot in the lubricating oil, which will make it necessary to change the lubricating oil and the lubricating oil filters more often to maintain engine cleanliness. A close check must be maintained on the lubricating oil to control fuel dilution and oxidation.

Improvements in starting, rough engine idling and exhaust smoke will be noted if the engine cooling-water temperature is raised to 165 deg F on the larger bore diesel engines. The use of high dome pistons in the Alco type 539 diesel engine to increase the compression ratio will also improve the engine performance and reduce smoke.

Lower cetane fuels have a higher Btu content per gallon and may require power piston setting changes from the builder's standards to compensate for the increased horsepower.

There will be a noticeable increase in fuel strainer and filter pick-up which will require more frequent change-out periods.

Some railroads have added a primary sock type filter element ahead of the standard sintered bronze filter for better filtration and to extend change-out periods. The rate of build-up on the fuel tank sight glasses is an indication of the condition of the fuel tank. It may be necessary to clean the sight glass and fuel tanks at shorter intervals.

A lacquer build-up may be experienced in the injection equipment, which will require more frequent cleaning, and these deposits can also cause injector sticking. Deposits on the lower portion of the injector plunger and barrel indicate that the fuel is unstable or contains sediment. Deposits at the top of the plunger and barrel, where the fuel and lubricating oils come in contact with each other, indicates incompatibility of the fuel and lubricating oil. This can also be caused by fuel dilution, lube-oil additives depleted, and lube oil being oxidized.

The selection, handling and policing of the lower grade fuels is necessary as there is no universal low-cost fuel on the market today. The mechanical departments have found that each fuel will present its own individual problem.

Various estimates were made of the value of low-grade fuels in the discussion of this report. It is believed that a price differential of from 1/2 to 1 1/4 cents per gal is required to cover the added cost of maintenance when low-grade fuels are used. No one would propose an exact figure. Engine temperature is evidently the most important factor in the use of "economy" fuels. It is also of prime importance in the reduction of sparking. It was reported that power assemblies require about twice as much maintenance when "economy" fuels are used. The Southern Pacific expects soon to have some cost figures available.

since it was first designed. Labor involved in renovating a pad varies from 9 to 11 cents. Overhead and the cost of pad repairs will bring total costs to near that charged by commercial plants, the committee reported. Several machines located along a large road might reduce handling and shipping costs.

In building machines, capacity should not be so small as to result in excessive labor costs. Several small machines at different points can easily raise the cost of renovation. At least one major road is contemplating the establishment of a large plant at a central location. Decision on using a number of smaller machines, or one large machine, may well be based on handling costs versus labor for renovation.

There are advantages in a railroad's handling its own renovation: (1) each operation can be supervised; (2) inventories can be kept to a minimum (pads can be renovated as soon as removed from cars); (3) supervisors can be better informed on the condition of pads before and after renovation (important for selection of pads).

One major user of pads has been quite successful in repairing them. This work is done in the upholstery shop. Only the best materials are used. Where possible, material is purchased ready cut to standardize repairs. Seams or metal fasteners that might contact the journal are avoided. More efficient set-ups are expected to lower repair costs from present direct labor charges of about 50 cents per pad.

Pad Life

With a substantial number of pads in service for 24 months or more, an estimate of service life is now available. A loss of slightly less than 1 per cent appears to be average for pads scrapped at the time of removal from the journal box. An additional scrap loss of slightly less than 10 per cent accounts for those scrapped after renovation. With better pads, and more rigid AAR specification, it is expected that the scrap loss of 10 per cent after 24 months' service will be substantially reduced, according to the committee.

Figures are not available on service life of pads that have seen 48 months' service with an intermediate 24-month repack. Some data is expected to be available in 1960. Field observations indicate that the majority of today's pads may not be suitable for renovation after 48 months. The committee recommends that renovated pads bear the month and year of renovation. A non-ferrous-button, applied at the time of renovation, would serve. Stenciling on the car does not indicate whether pads are new or renovated when applied, and the majority of pads now in service carry no manufactured date.

There is little information on performance of pads which have been properly renovated and returned to service after 24 months. However, information coming from one large pad user, which has been renovating according to specification since July 1957, shows that, as the percentage of cars equipped with renovated pads increased, the number of hot boxes on pad-

(Continued on Page 55)

Pads Need Economical Renovation

Choosing the proper method for the renovation of journal lubricating devices and the effectiveness of this renovation are of great importance to car officers. The CDOA Committee on Car Lubrication reported that "field observations indicate the majority of the pads now in service may not be suitable after four years' service for renovation and additional [24-month] repack period."

The committee devoted its efforts this year exclusively to renovation and life studies. Renovation is not a cleaning operation in which the pad is "swished in a bucket of oil or blown with compressed air," according to the committee. At present, railroads are utilizing three methods of renovation:

- Contracting with an outside firm to do the work;
- Leasing a renovating machine which is then operated by railroad personnel;
- Building or purchasing a renovating machine which is operated by railroad personnel.

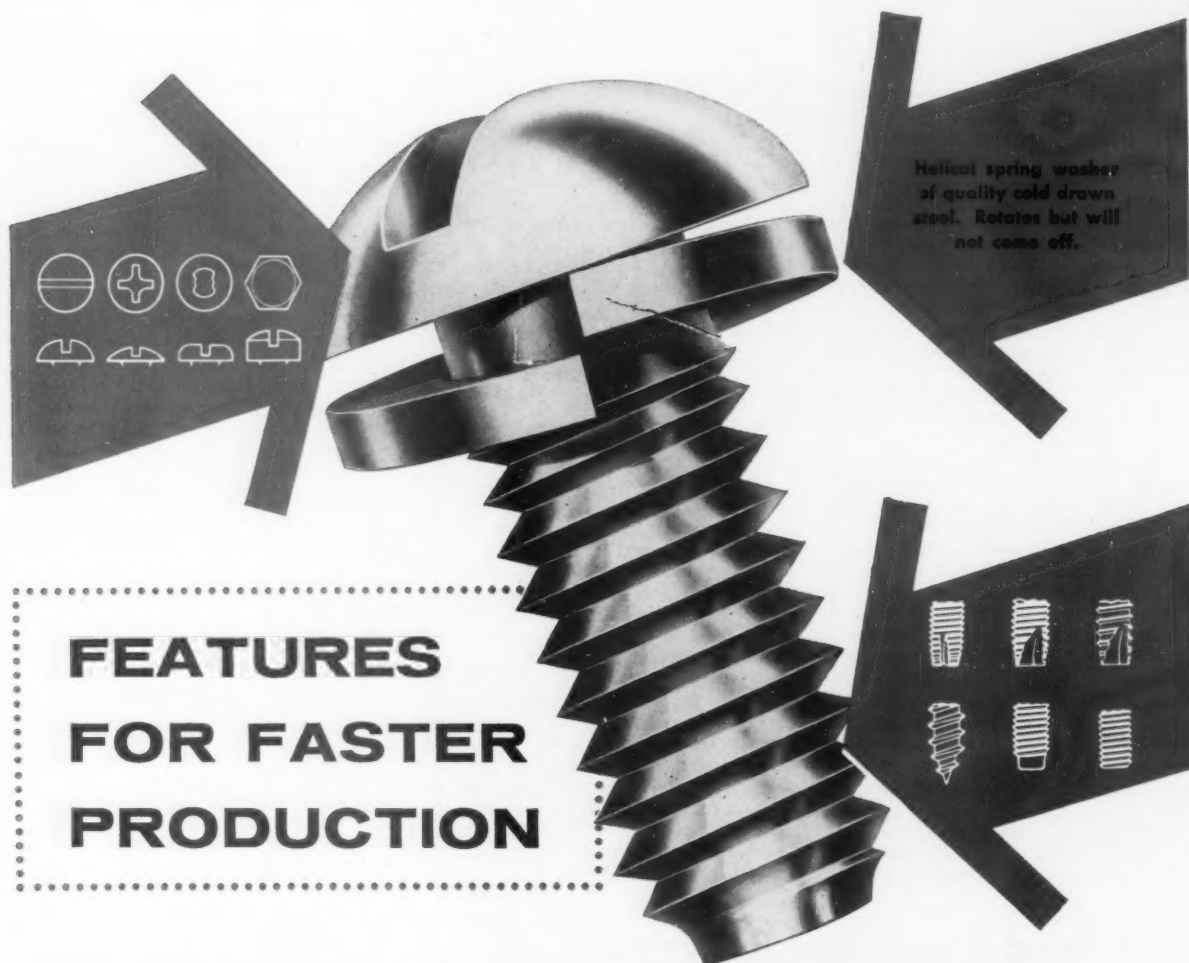
Contracting the work may appeal to smaller roads wishing to minimize personnel and investment. This method may also appeal to larger roads which have commercial firms doing this work on their lines.

The renovating charge may vary from 25 to 35 cents per pad. To this must be added handling costs and freight charges.

One machine available for lease is of the centrifugal type with an agitator. The entire cleaning cycle for this type of machine is 7 to 8 min. From 8 to 12 pads are placed in the machine and sprayed for 30 sec. with oil at 220 to 240 deg. The agitation cycle then starts and continues for 2 1/2 min. After being agitated, the pads are distributed evenly for the extraction cycle which requires 2 1/2 min. at a speed of 1,300 rpm. The oil is then dumped into a storage tank for filtration and reuse. Pads are removed, inspected and gaged. Rental charges for this machine vary slightly, depending on the contract.

Purchasing or building a machine for operation by railroad personnel is viewed with considerable interest by some larger roads. Information on one company-built machine was recently made available to all member roads. It will clean 32 pads per hr. Oil is continually filtered while the machine is in use. Good filtering makes it possible to reuse the oil without additional tanks for coagulation and precipitation. Several improvements have been made to this machine

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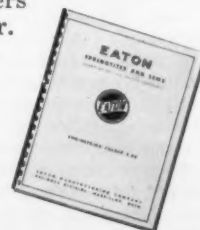
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equipped cars decreased. Operation of 38,628 pad-equipped cars, with 29 per cent of them on renovated pads, for the first six months of 1959 with only 24 hot boxes, the committee believes, definitely establishes the fact that pads renovated according to AAR Specification AAR M-910A are good performers.

Is the AAR prescribed renovation period of 24 months too long? Accumulation of foreign matter will affect the wicking ability of pads, the committee reported, and this condition affects certain pads more than others. Data from three railroads showed the following data on age of pads and hot-box incidence:

Age, mo.	Hot boxes, per cent
0-6	25.0
6-12	17.3
12-18	16.3
18-24	16.4

The committee commented on the significance of the hot-box frequency for pads less than 12 months old. It said that more attention should be given to initial saturation of pads and to their application.

The "throw-away" pads now being developed by several manufacturers would not require renovation. They would be designed to give 24 months' service, or more, and would then be discarded. Selling prices would vary with length of service promised.

A. J. Schulte, AT&SF, chairman of AAR Lubrication Committee, said that any renovating machine must remove dirt, remove moisture, and restore resiliency of the pad. He added that controlled service tests of lubricator pads should be made on non-in-

terchange equipment, because interchange cars must be handled according to the interchange rules, and this can lead to loss of test pads at repack periods.

A Norfolk & Western officer reported that 99 per cent of the N&W hoppers are now on pads and are giving "good results." Pads are giving 3 to 1 better performance. Although the N&W's miles-per-hotbox figure is only slightly better than it was in 1954, the main trouble is with foreign waste-packed cars, with 75 to 80 per cent of the hotboxes occurring on this equipment. Since the N&W started carrying ½ in. of free oil and is servicing the lubricator-equipped boxes only once each 700 or 800 miles, there have been few complaints of oily rails.

R. C. Maley, T&NO, said that his road surveyed 53 railroads and car lines which have operated 10,000 car sets of journal stops for a total of 165,000 car-months. Their figures indicated only 28 hotboxes, or one each 8,000,000 car-miles. He said the T&NO will install 850 sets of stops in 1959 and 1,200 in 1960. At present, 78 per cent of T&NO cars are on lubricators. A Milwaukee officer said that, while the pad is a great step forward, journal stops are needed to make the pads even more successful.

J. R. Jennings, general manager of Wilson Car Lines, said that waste-packed WCLX cars used 4.62 bearings per car per year during the years 1953 to 1956. With lubricator pads this figure is down by one-quarter. WCLX cars with journal stops have been using 0.11 bearings per car per year.

ally it is due to misunderstanding, disobedience of rules, or lack of proper instruction and methods.

The following practices and instructions, if obeyed, should reduce the number of delays of this type. Before a locomotive is coupled to a train, the brake pipe should be blown out. Care should be taken not to cause an emergency application. After coupling up the brake pipe hose, the angle cock should be opened slowly. Engineers are instructed to make a 20 psi brake pipe reduction, leave the automatic brake handle in lap position until the angle cocks are opened, then go to running position. This applies at any time, on the road or in yard, whenever a locomotive is coupled to a train.

The main reservoir supply must be kept at least 15 psi above the feed valve setting, increasing the diesel engine speed if necessary. The automatic brake handle must be kept in running position until a signal to apply brakes is received. When the signal is received (air pressure on the rear car is within 15 psi of the feed valve setting but not less than 60 psi), the rules require the engineer to make a 15 psi brake pipe reduction, lap the brake valve, and observe brake pipe leakage for one minute as shown on the gage. The maintaining feature is to be cut out if locomotive is equipped with this type of brake valve.

Low Temperature Tests

When this test is made on a 100 car train, while temperatures are 10 deg below zero or colder, another cause of train delay may develop. With a train line taper of 15 psi, the quick service action of the AB valves will reduce the brake pipe an additional 2 to 4 psi. This could be read as brake pipe leakage. A train delay could result while trying to correct leakage that does not exist.

This rule should be modified to allow for an end to quick service activity. When the air test has been completed and sufficient time allowed for brakes to release and for brake pipe pressure on rear of train to be restored, the train may proceed. The rules do not require the train to wait until the brake pipe pressure has been restored to within 15 psi of the feed valve setting.

After a locomotive is attached and the train is being charged, all possible leakage should be corrected. Angle cocks should be inspected to insure they are in fully-opened positions. If the required brake pipe pressure is not obtained at the rear, it may be necessary to walk the train again, correcting additional leaks.

If leakage is still excessive, Great Northern instructions are as follows: Starting at rear of train, walk forward five cars and close both angle cocks between the 5th and 6th cars. Couple a test gage to the brake pipe hose of the 6th car and slowly open the angle cock. If the required air pressure is shown on the test gage at this point, the supervisor should be notified to reduce the train five cars. If the pressure is not up, continue forward five cars at a time until a satisfactory charge is shown on the gage. Reduction of cars should be made from the rear of train. From past experience, the additional time spent in trying to find and correct leakage results in additional delay.

(Continued on Page 60)

Improving Cold Weather Operation

Despite improvements in materials, modification of air brake equipment and parts, and reduced leakage, the desire of most railroads to operate freight trains of consistent lengths throughout the year has not been achieved. During cold weather, it is still necessary to reduce train lengths, and delays are caused by the difficulty of getting the required brake pipe air pressure at the rear of trains. D. E. Whitney, assistant general air brake supervisor of the Great Northern, told the Air Brake Association of the practices, rules and tests made on his railroad to prevent unnecessary delays and discussed conditions which must be corrected if future operation is to be improved.

A thorough inspection and test is of prime importance before a locomotive is dispatched. This includes air brake devices, gages, air hose and accessories, compressor control switches and functioning of all other control equipment. Special tests of locomotive feed and maintaining valves are then made to minimize delays in yard and on road.

Train charging delays, due to the air brake equipment on cabooses, have been numerous in the past. Excessive brake pipe or system leakage and faulty air gages usually cause this type of delay. While the

placing of revenue freight cars which have excessive leakage at the rear of train cannot be controlled, caboose maintenance can be improved by frequent attention. Single car testing is done every 90 days. Gages incorrect by more than 2 psi are changed. New Wabco seal angle cocks, which include the "O" ring to prevent leakage, and Teflon coated keys are applied to cabooses.

Charging and Testing Trains

A properly tested locomotive should provide an ample supply of compressed air to locomotive and train brake pipe. A compressor with a delivery of 125 cfm will supply the required amount of air for charging a 150 car train with 6 psi per minute leakage. A popular misconception is that more units in multiple should be able to charge more cars and they should do it faster. The longer brake pipe and larger number of bends on the locomotive will slow the charging rate.

There are benefits from having additional units. The work load on each compressor is reduced so that cooler air is discharged. Water vapor is removed more efficiently by the radiation system. Not all train charging or terminal air test delays can be attributed to air leaks or mechanical faults. Occasion-



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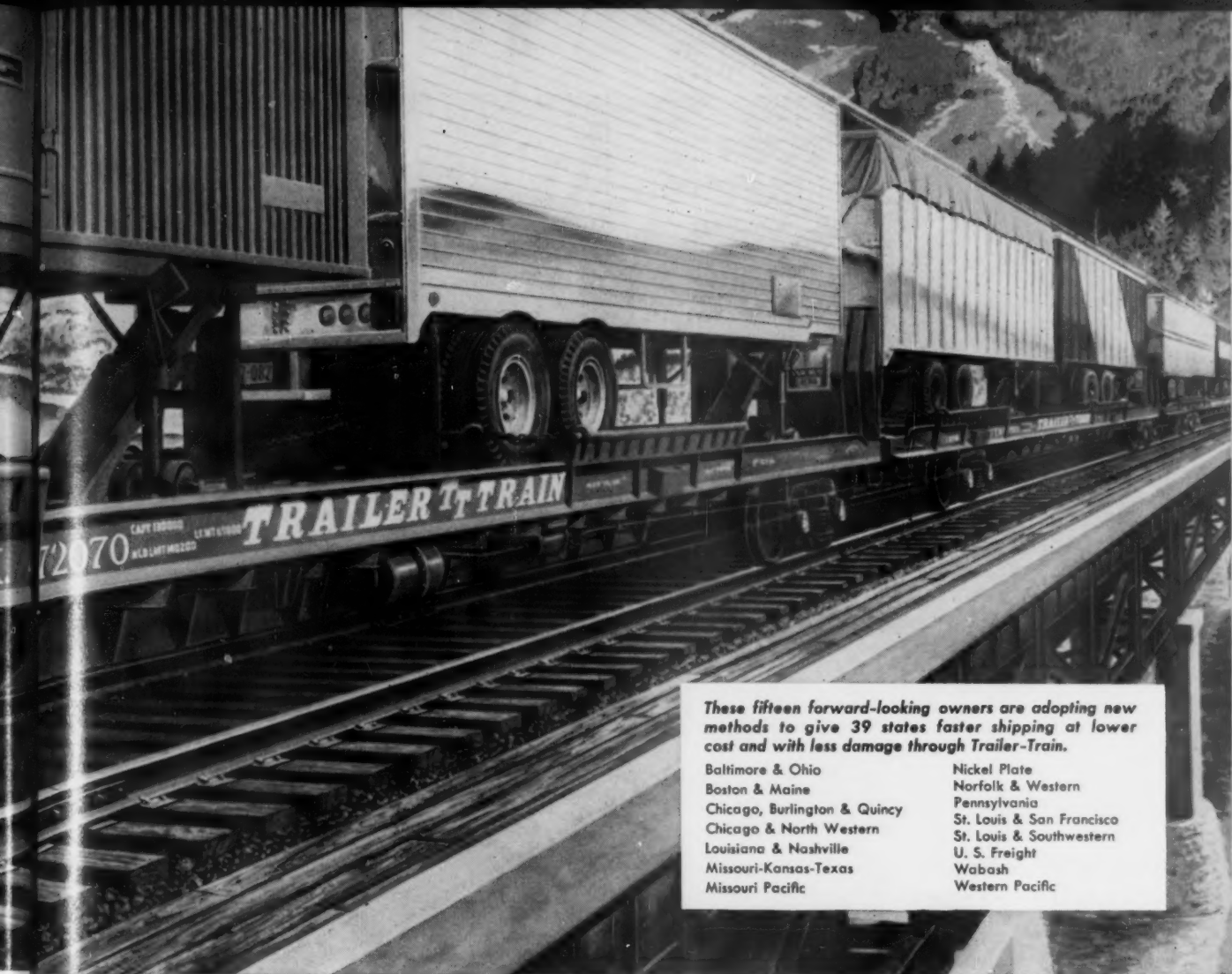
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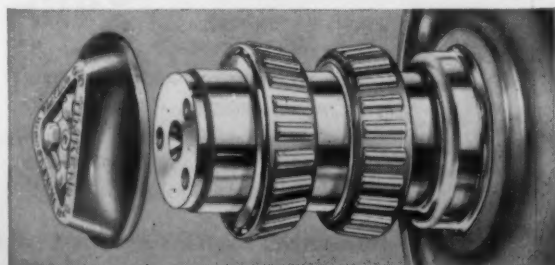
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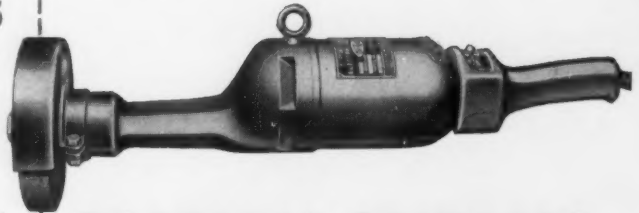
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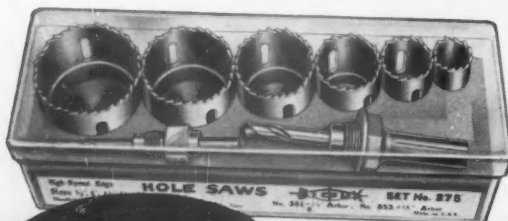
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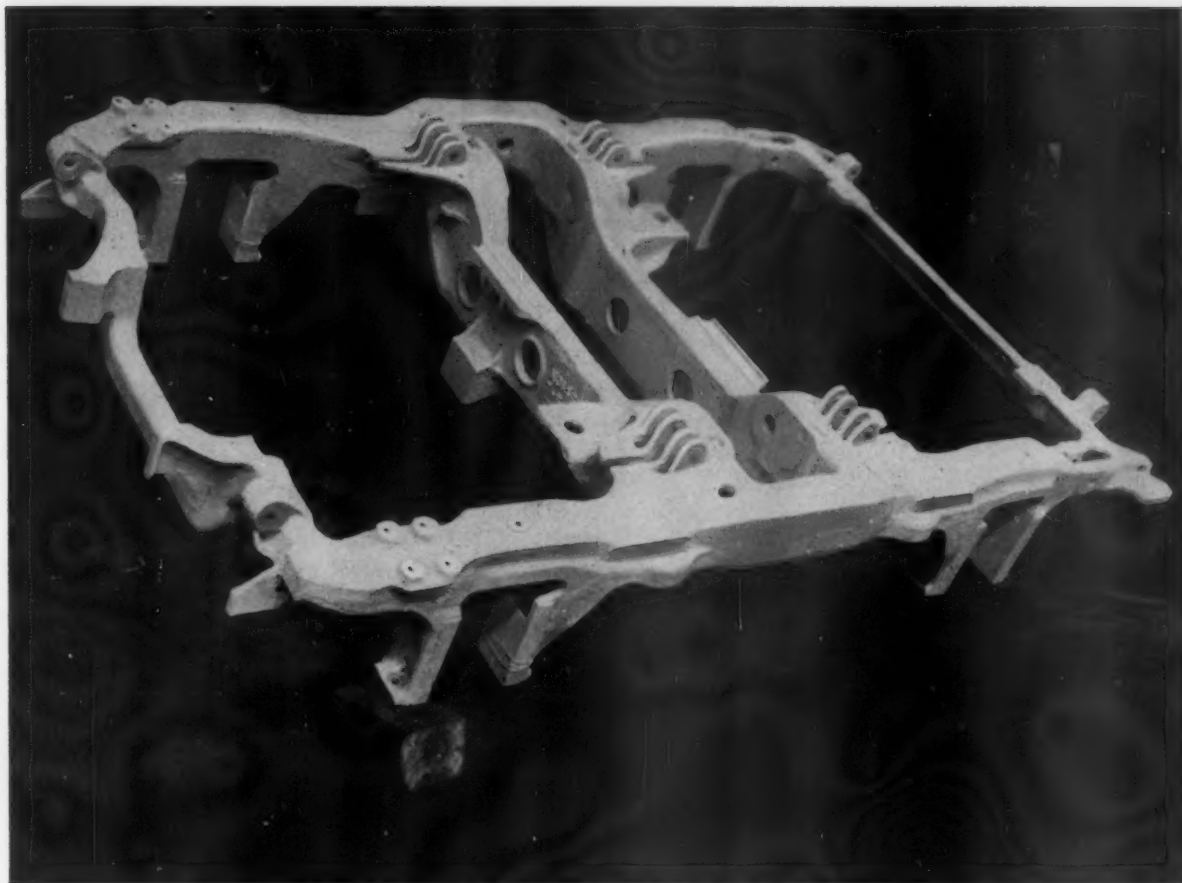
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INCO NICKEL

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(Continued from page 55)

In the majority of cases, it will be necessary to reduce the train length.

During cold weather, there have been instances where charging of trains was difficult to explain. Two trains having the same number of cars, class of locomotive, outside temperature and the same carmen can vary widely in the times required to correct leakage. The most troublesome trains contained a considerable number of older cars built 15 to 20 years ago. During a heavy repair program this year, inspections were made to determine the condition of flange union gaskets, fittings and piping on 1000 box cars built from 1937 to 1942.

On the first 83 cars there were 97 broken pipes—an average of 1.16 per car. Sixty-four occurred on brake cylinder and auxiliary reservoir pipes. A total of 113 flange union gaskets were found leaking—an average of 1.36 per car. Of 996 gaskets inspected, 768 were found unserviceable—77.1 per cent. Correction of these conditions would be a major step toward elimination of leakage on freight cars.

The addition of brake cylinder release valves to freight cars will expedite movement of trains during both summer and winter. Bleeding cars with the ordinary reservoir release valve, particularly during cold weather, causes carmen to be care-

less. Blocking or bending the release valve rods to continue the draining of air from reservoirs is one of these practices. Quite often, this results in brake pipe leakage.

There is good reason to believe system leakage would also be reduced. Charged brake equipment, during a period of sharply decreasing temperatures, will not develop the leakage that shows up on the same equipment, if cooled while it is uncharged. It is believed that many cars equipped with brake cylinder release valves would go for days, if not weeks, without losing a substantial charge in the reservoirs and all passages of the equipment that normally carry reservoir pressures.

Crying Over Spilled Coffee

By C. Charles

Ken, the road foreman of engines, had booked out on westbound Manifest 491 and his partner, Slim, was coming through on eastbound Manifest 491. Each freight was handling 95 cars and was hauled by three new 1750-hp diesel road switchers.

Neither train movement was unusual. However, there was a new air of importance about the two road foremen. This was unusual for Ken and Slim. They were competent fellows and generally went about their jobs with unassuming manners.

This day, however, the new locomotives assigned to haul the two manifests were equipped with the recently introduced 26-L air brake equipment. The two road foremen were going along to instruct the enginemen. Special emphasis was to be placed on the 26-L relay valve and on the pressure maintaining feature of this equipment.

George, the air brake instructor, had covered the benefits of the new brake with Ken and Slim, emphasizing that brake pipe pressure could be maintained from any service reduction. This overcomes the adverse effects of brake pipe leakage—improving slack control, reducing damage to cars and lading, and improving the feelings of the men in cabooses toward enginemen.

When the two road foremen got back to the terminal, George met Ken in the yard office and questioned him about his trip. Ken excitedly stated that the trip had been the smoothest run he had ever made. Payoff was the conductor's experience in pouring coffee into his cup on the table in the ca-

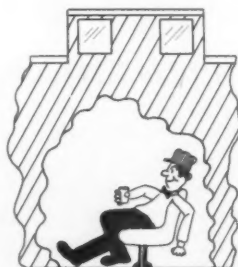
boose without spilling a drop. George was elated after receiving Ken's report, but on his way from the yard office, he met Slim and was quite taken back when he noted a malicious gleam in Slim's eyes.

It was quite apparent that Slim was not happy. It developed he had experienced more slack action on this run than on previous trips with locomotives having standard 24-RL brake. The conductor had complained bitterly of his rough ride, saying he could not hold a cup of coffee without spilling it and certainly couldn't place it on the caboose table.

"I am from Missouri," Slim concluded, "there is no pressure maintaining on these locomotives."

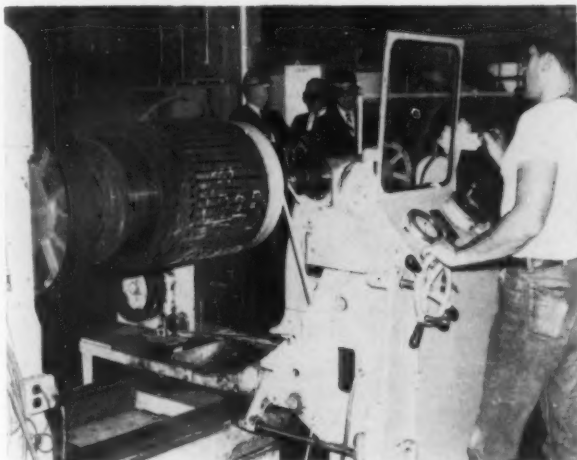
An alarmed George soon had machinists up in the cabs testing brakes. Sure enough, there was no pressure maintaining on the unit in the lead position. There was maintaining on the other two, however. After considerable trouble shooting, a serious air leak was found at the equalizing reservoir pipe gauge connection. It was difficult to locate because of the gauge stand and cowlings.

This leak was nullifying the pressure maintaining feature because the equalizing pressure at the relay valve was being reduced. The differential required for the pressure maintaining was being lost. Repairing this leak made Slim and the conductor considerably happier on their next trip.

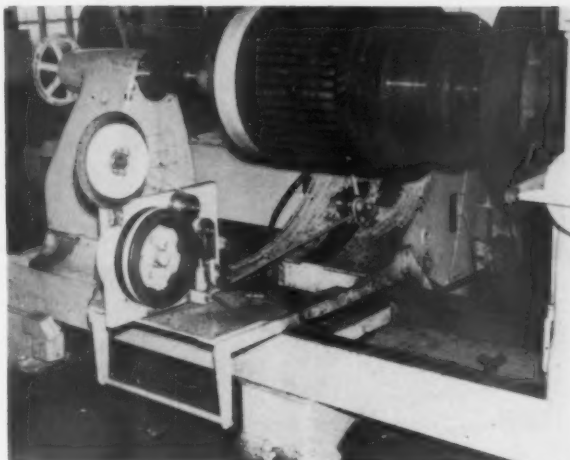


Second installment of series describing 26-L Locomotive Brake Equipment. Part 1 appeared in June 1959 issue, p 51.

ELECTRICAL SECTION



Glass banding has been adopted universally by the Pennsy. Banding machines at Altoona electrical shop are now applying the material.



Tensioning device for glass banding was developed by the PRR. It has proved to be as satisfactory for job as commercial devices.

Pennsy Cuts Motor Repair Costs

New insulation and component redesign result in less complicated and less expensive maintenance

Integrated insulation, incorporating epoxy resins, has been adopted by the Pennsylvania as the standard for its traction motors and traction generators. The new insulation has resulted from a four-year research and development program (RL&C, September 1959, p 86).

While satisfactory epoxy formulations were developed by suppliers, their applications to large railway motors and generators were the result of work by the PRR mechanical department. During the course of this program, a series of design improvements and new repair techniques were developed. More and more motor components are being bonded together with epoxies, reducing the danger from contaminants, cutting down on the possibility of vibration damage, and insuring greater service life from parts.

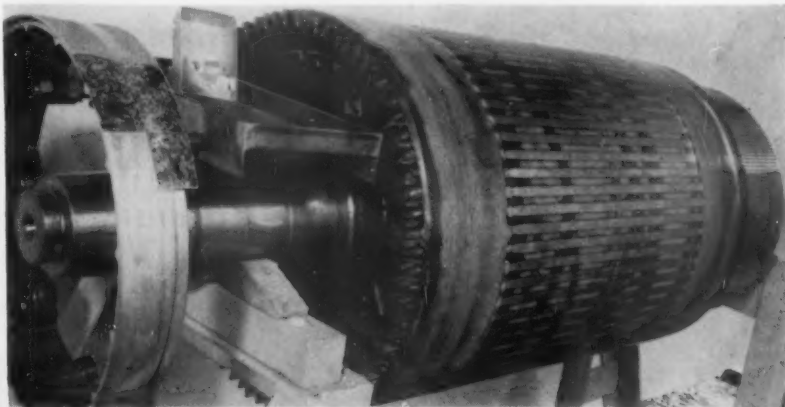
Along with standardizing on epoxy

resins, the PRR will be using polyester-impregnated glass tape bands in place of steel wire for holding armature coils in place. Armature short circuits can result in the snapping of steel bands, causing as much as \$5,500 damage to the motor as banding unwinds. Glass banding saves over \$4,000 in repair costs when shorts do

occur, because it causes little or no damage to armature or field coils.

A PRR-developed tensioning device is being used by Pennsy shops to apply the glass banding. It costs about one-eighth as much as commercially built machines. The process of applying steel bands, including the securing

(Continued on page 64)



Completed armature incorporates all PRR developments which include one-piece coils, the integrated insulation with epoxy resins, and glass banding. Arrangement is standard for PRR locomotives now.

This is the second of two articles on a Pennsylvania program to improve maintenance and operating characteristics of rotating electrical equipment. The first appeared in the September 1959 issue.

*Executive
excitement*

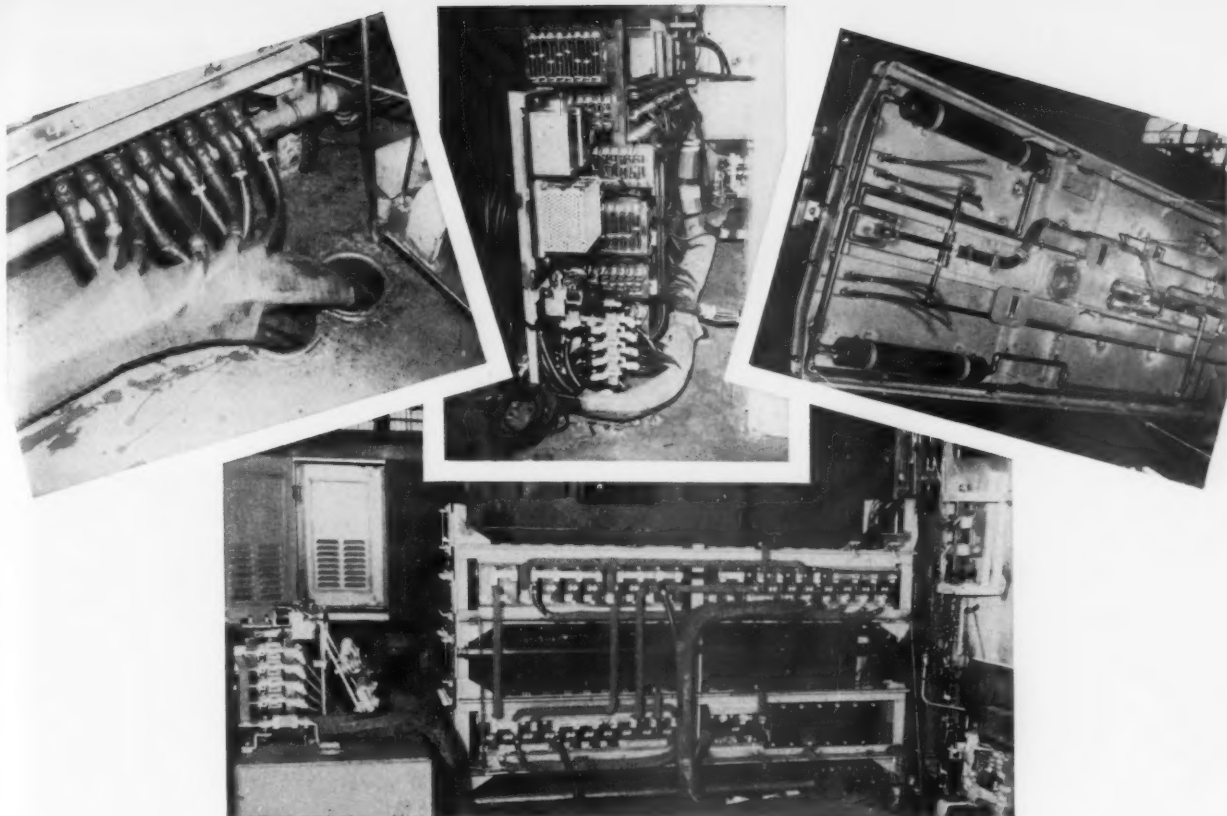


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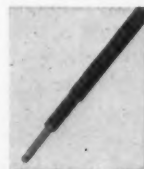
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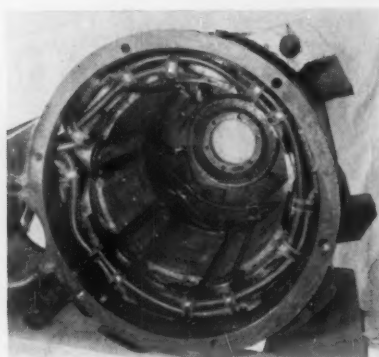


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Old style, open-face poles in Westinghouse motor frame (left) have been replaced with new style poles (right) having epoxy impregnation, and greater copper conductor area.



Coil tree, developed by Westinghouse, is used at Altoona Works for applying motor coils.



Different styles of main poles in EMD frame have been replaced with single universal model.

been no failures, it is not possible for PRR officers to estimate the service life of any of the new style field coils.

Field coils received initial attention in the program because they had been the greatest source of failures. However, much has been done with armatures in addition to the application of integrated insulation and the use of glass banding.

A redesign with 10 per cent more copper was possible in armature coils. Not only is the copper cross-section increased, which results in lower operating temperatures, but an aluminum oxide filler is used to increase the heat conduction properties of the insulation. Aluminum oxide is not an electrical conductor, but does assist in getting heat out of the armature coils.

Probably the most significant development was the new one-piece armature coil which the PRR produced. By replacing the standard two-piece coil with the single-piece type, the number of coil-end connections which have to be made in completing a typical armature has been cut from 210 to 70. This means that the brazing job can now be done in 1 hr instead of the 3 to 4 hrs formerly necessary.

Satisfactory epoxy impregnation of armatures took considerable development work (RL&C, April 1959, p 57). The material must not become rock-hard if it is to operate satisfactorily. In addition, different epoxy formulations are necessary if the coil is to be applied by the railroad already impregnated, or if a rewound armature is to be completely impregnated by Motor Coils Manufacturing Co., the organization which has, until now, done all the PRR epoxy impregnation. Impregnated armatures must be rotated in stands to distribute the epoxy evenly and prevent resin run-out during the curing



Band is removed as "tree" enters frame; interpoles are bolted to "tree"; main poles keyed.

(Continued from page 61)

of the band ends, takes about 6 man hours. The new glass band process takes about ½ man hour, using techniques previously described (RL&C December 1957, p 38).

The decreased insulation space necessary with the integrated insulation system has made it possible to provide about 10 per cent more copper in redesigned armature and field coils. This results in lower operating temperatures. However, the redesign of coils by the PRR did not stop there.

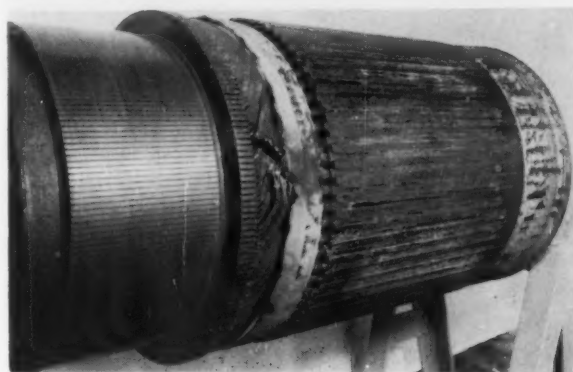
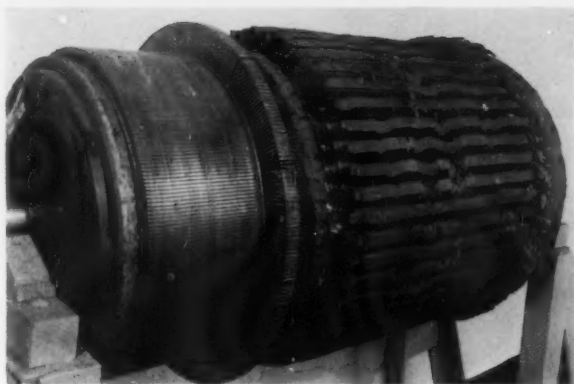
A series of new coils have been developed for the traction motors of the major manufacturers. For example, there were three styles of main field coils necessary to fill the four coil positions in the standard Electro-Motive traction motor. By redesigning coil leads, it is now possible to use a single style of PRR coil at all four locations. This universal coil simplifies inventory and installation problems. Epoxy impregnation of the field coil and pole piece produces a single assembly which also simplifies installation. Since 1956, when epoxy impregnation began, commutating coil repair costs have been cut by 30 per cent. Because there have

process. The end result is an assembly in which coils are solidly bonded in the slots, resulting in high heat transfer and effectively sealing against moisture, oil and contaminants to provide uniform high insulation resistance.

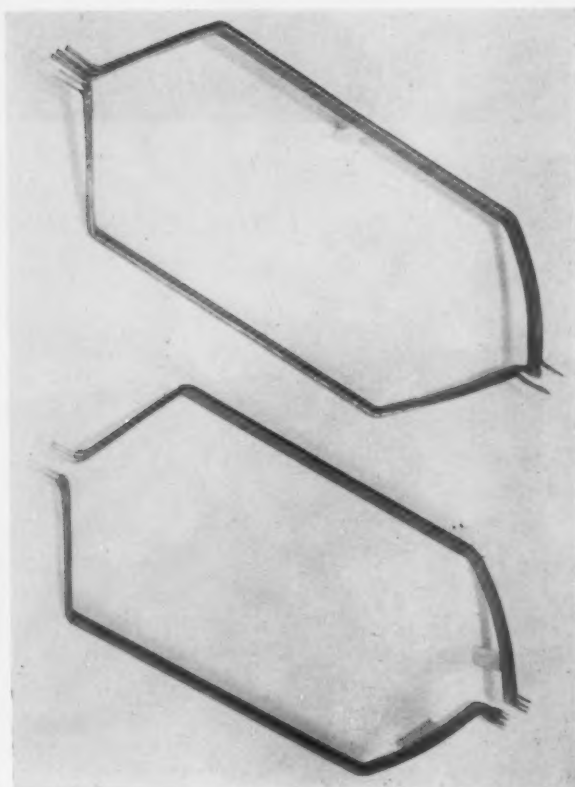
After armature impregnation had been satisfactorily developed, it became a tool for making possible a whole series of cost-cutting salvage operations. This does not mean that all armatures can be salvaged without rewinding. However, many costly rewinding jobs have been avoided by judicious use of the high-vacuum epoxy impregnation.

Varnish impregnated armatures with over a year of potential service remaining in them are impregnated with epoxy if they develop low megger readings which cannot be corrected by baking alone. The epoxy can be forced into interstices which have developed in the armature insulation.

In the case of a grounded armature coil, the varnish is removed in a trichloroethylene vat and the armature is then impregnated with the epoxy resin. Grounds have been satisfactorily cleaned with this process. A similar procedure is used to unitize an arma-



Damage caused to steel-banded armature (above) by breaking band is far more serious than that caused by glass-band failure (below).



One-piece armature coil (above) has replaced two-piece style (below). Application of new type has proved to be more economical.

ture in which commutator segments have shifted slightly. The end ring well will be backed out to loosen the segments and the commutator will then be impregnated. The segments are brought back to their proper positions as the commutator is tightened and are fixed there when the epoxy "sets up." The "undercutting" is done prior to the completion of curing, at which time the plastic epoxy can be cleaned from between the segments. Cleaning up this rebuilt commutator is done by taking a light cut across the surface with the armature in a lathe. This removes the hardened epoxy and trues the commutating surface.

Repair Technique

Another cost-cutting repair technique is the application of a new or rebuilt commutator to an existing serviceable winding. After removal of the defective commutator, the cross connectors already insulated are applied to the new commutator prior to its installation. A clearance of 0.002 to 0.003 in. is provided around the cross connectors. Existing armature winding leads must be cleaned and posi-

tioned prior to assembly. The winding coil ends must be lined up to enter the proper commutator riser slots as the commutator and cross-connector assembly is pressed into position. Epoxy impregnation fills the clearance around the cross connectors and solidifies the entire assembly. This job can be done for well under \$1,000 as compared to the \$1,700 cost of scrapping both commutator and winding.

The utilization of an impregnating material which is resistant to moisture and contamination and which was chosen to solve high temperature problems, presents no problem if a motor or generator field coil or armature must be stripped. After providing a suitable shielding for armature commutators, according to the PRR, any of these components can be incinerated at temperatures high enough to cause polymerization of the epoxy. The material passes off as a gas, leaving the metal parts ready for reworking.

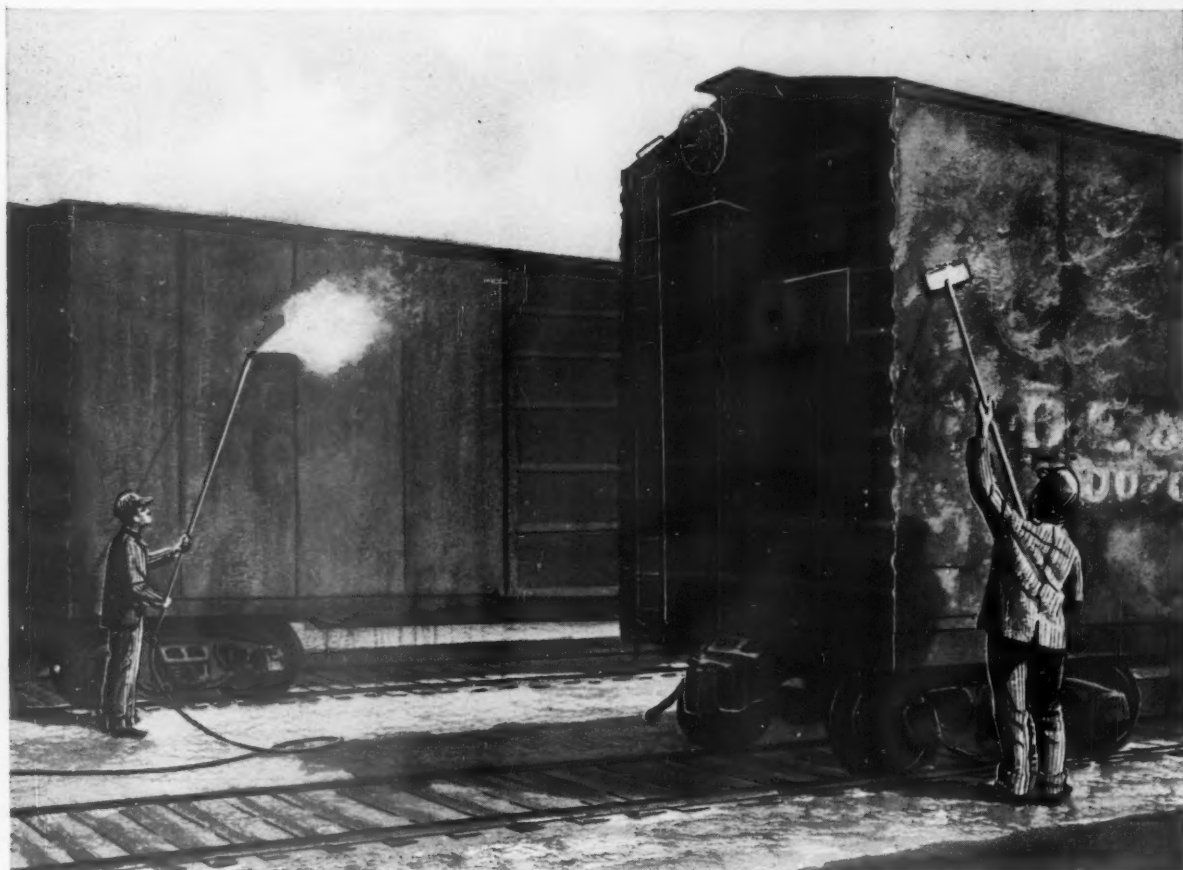
The PRR is making its motor improvements available to other railroads and to the electrical industry. Some roads have already adopted some of them. According to PRR officers, sev-



Brazing of coil ends has been simplified with adoption of one-piece armature coil. For a typical motor, there are now 70 coil-end connections to be made as compared with 210 that are necessary with armature as originally built. This means that a job once taking 3 to 4 man-hours can now be completed in 30 min.

eral manufacturers are working to develop synthetic resins equivalent to those now used by the Pennsy. The entire motor improvement project has been part of a continuing program by the PRR mechanical department to insure locomotive performance and cut costs.

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RAILWAY LOCOMOTIVES AND CARS • OCTOBER, 1959

Armature Binding and Balancing

No matter how good an armature winding may be, it cannot last long in service unless properly banded. Temperature changes, vibration and centrifugal force all contribute to loosen the coils in the slots. The purpose of armature bands is to hold the coils in place. To do this the bands must be tight. If they loosen in service, the armature is headed for failure.

Bands loosen, either because the end windings are not packed tightly enough by the temporary binding, or because the insulation and coils shrink. The high temperatures at which armatures run in heavy service tends to shrink the insulation. Heavy service also involves vibration and temperature changes. Armature bands must keep the coils tight so they will not

wear out by vibration and chafing.

If there were no insulation in an armature, and if binding bands could be applied directly over the copper, it would be easy to put on bands that would stay tight. Insulation is the "fly in the ointment." Some of its ingredients are hard and incompressible. They do not shrink or squeeze out. On the other hand, all insulating systems contain varnish or other resinous material used to stick the mica together or to strengthen the glass fabrics. This is the part that tends to shrink or to ooze out, allowing the bands to loosen.

Temporary Binding

Temporary binding solidifies the insulation and coils, and gives a firm base for permanent bands. In temporary binding it is good to remember that heat softens varnish, silicone, and other resinous materials. In time these resins flow out of the high pressure spots, allowing the bands to relax. To

pack the insulation down solidly you must have temperature, time and binding wire tension. The armature is usually heated to about 125 deg C before applying the temporary binding. During the binding operation the armature has plenty of time to cool down. It is very important to put it back in the oven after the temporary binding is in place. Leave it long enough to bring the whole armature back to about 110 deg C, but don't bake it too much or you will ruin the flux and end up with a poor solder job.

A pressure autoclave or "squeeze bag", Fig. 1, can be used in place of temporary binding. This process also requires temperature, time and pressure. "Pressure sticks" must be used to equalize the autoclave pressure. They have a T-shaped cross section for the slot portion and a rectangular section for the end windings. The armature is heated to about 125 deg C and put into the autoclave. Pressure is applied either by air or oil and held until the armature cools to about 50 deg C. Permanent bands are then applied. This method is economical for traction motors, provided the volume of work is enough to justify the investment in the autoclave.

Binding Methods

There are two main methods of binding armatures. The more common is the straight tension method. In this the binding lathe has a friction device, Fig. 2, which can be adjusted to get proper wire tension. The second method is rerolling. It consists of applying the temporary binding wire as usual, except that after it is in place the ends are anchored to the armature and a rerolling apparatus, Fig. 2, is used. Fig. 3 shows another method of rerolling using less expensive equipment.

Whatever equipment you use, be sure you know the tension in the wire. Tension measuring devices usually show the force exerted on the idler pulley around which one turn of wire

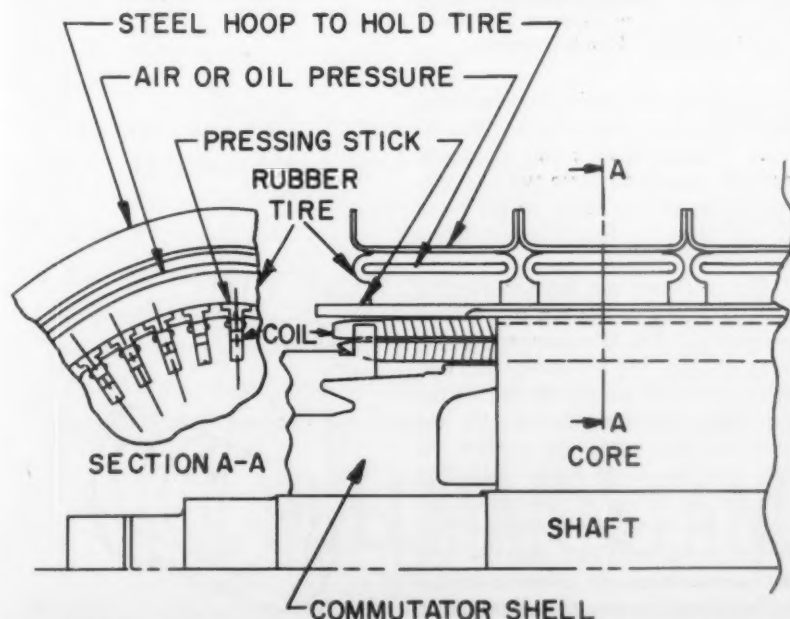


Fig. 1—Section through armature illustrates the use of an autoclave for pressing coils into their slots instead of using temporary binding.

Air Cylinder Applies Tension During Re-Rolling Operation

Friction Tension Device For Conventional Banding

Traversing Handle

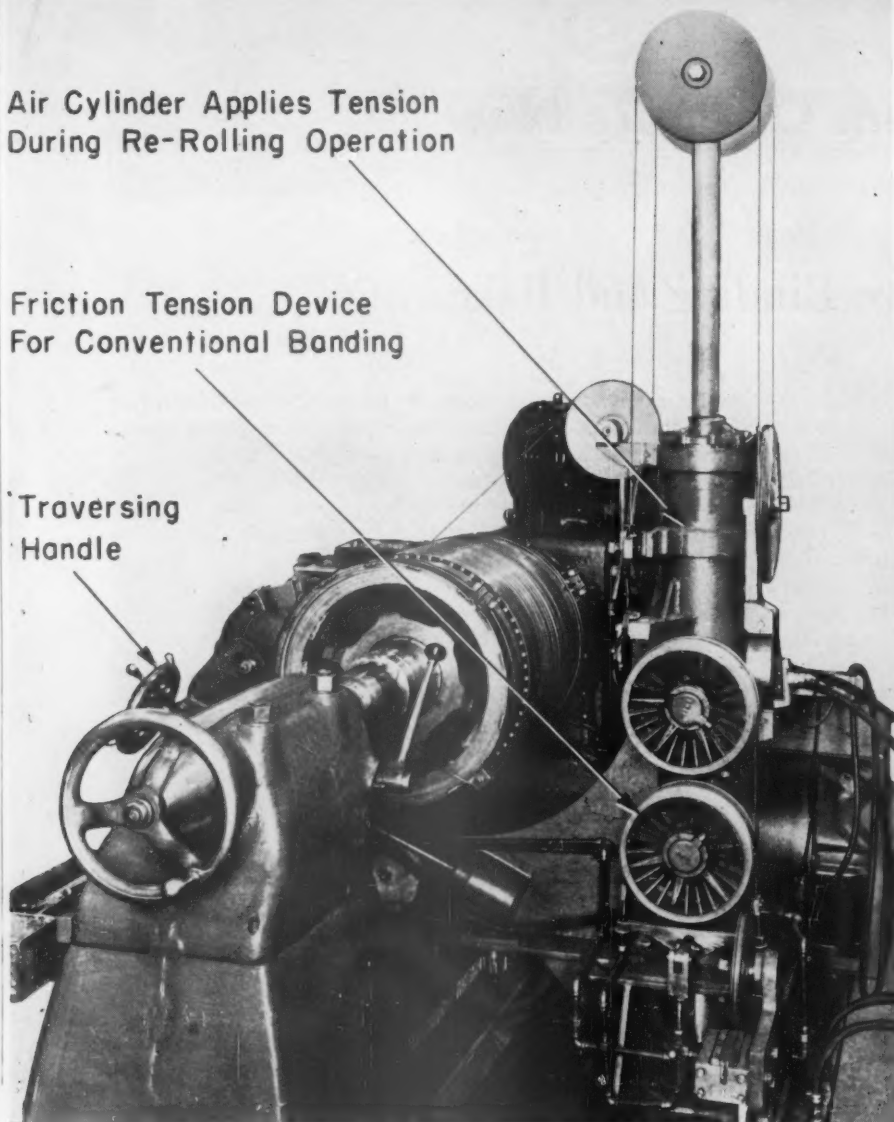


Fig. 2—Lathe used for armature banding has been altered to make it possible to do rerolling. Originally machine was fitted with equipment to do only conventional tension banding.

is passed. This is actually twice the tension in the wire.

In the simple equipment, Fig. 3, the tension device is just a long beam with a pulley at one end and a weight at the other. The beam is supported from a crane. The wire passes around the pulley and its ends are anchored to the armature. The problem is to decide at what point to support the beam. Suppose you want 500 lb tension on the wire using a beam 100 in. long and a 150-lb weight, where should the beam be supported? This is a simple problem, but its tricky! Try solving it and check with the answer at the end of the article.

Temporary Binding

The rerolling method is generally used for large, heavy-duty traction

motors. Conventional temporary binding is used successfully for smaller motors, auxiliary motors and large generators. Bands on these types of machines are not as likely to get loose as are those on heavy-duty traction motors.

The conventional tension binding method is simple but not as effective as rerolling. This is because successive turns compact the armature more and more. As a result the tension in the preceding turns is relaxed. By the time the final turns are applied the first ones are quite loose. Rerolling has the advantage of taking up the slack in the turns. By rerolling a band several times, every turn comes to have the same tension. In either method it is important to return the armature to the oven after the wire is in its final position. This softens the insulation

and allows it to solidify under pressure of the binding wire.

Wedges are usually driven into place after the temporary binding has been removed but before the permanent bands are applied. To be effective, a wedge should be tight, that is, it should push down against the top of the coil, and the pressure should be taken on the slanted sides of the wedge. Filler strips are usually placed under the wedge. They act as slipper strips so the wedge can slide over the top of the coil. They also provide an adjustment so the wedge can be made to bear down on the coil.

After the wedge is driven it should be checked by tapping while holding the forefinger on the surface. If a buzzing or looseness is felt, the wedge should be removed and extra filler strips placed in the slot, and the wedge redriven.

Permanent Banding

Both straight tension and rerolling are used in applying permanent bands. In either case the job requires considerable skill. Successive turns should be driven against each other to form a tight band. Anchor clips are more important than binding clips as they hold the start and finish of the wire. They should be able to hold the binding wire tension even if the solder on the band is melted by overheating or flashover. They are generally high-strength materials. (Continued on page 70)

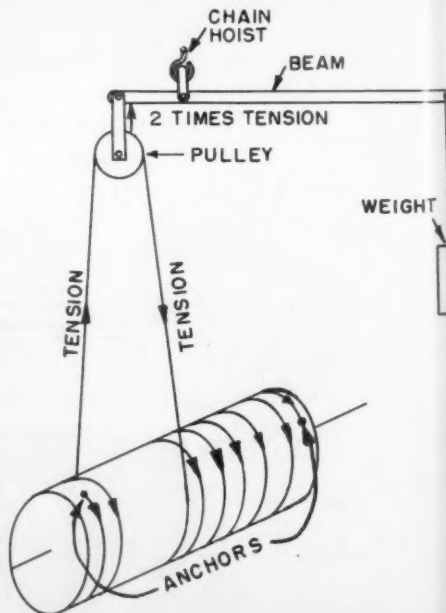


Fig. 3—Less expensive than device shown above, this method can be used for binding.

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- P-S Box Car Side Doors offered low first cost, thanks to standardized production.

- P-S engineers welcomed the opportunity to assist the railroad builders in adapting the P-S door.

Of course, in addition to these immediate cost benefits, the GM&O can look forward to many years of trouble-free service from their P-S Side Doors.

Check into the complete line of P-S Freight Car Parts before you specify for any rebuilding or repair programs—you'll be glad you did, the benefits are important.

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terials while the ordinary clips are soft, low-strength steel with a tinned coating.

It is highly important to do a workman-like job of bending the final end of the wire around the binding clip and anchoring the clip under the adjacent turns of wire. Before cutting the wire, apply a patch of solder to the band so the tension of the turns is not relaxed when the wire is cut, see Fig. 4. After cutting, the loose end is threaded through the anchor clip loop and snugged up tight. Then it is bent sharply around the clip and cut off close to the hook.

The band is soldered to solidify it and keep the turns from slipping. Don't use tin. It has a low melting point and will melt in service if short overloads or flashovers occur. Instead, use a high melting point solder, such as 97.5 percent lead, 1.5 percent silver and 1 percent tin. This has a melting point about 70 deg C higher than tin. It requires a so-called "activated" flux—rosin just won't work. The soldering iron must be kept clean and must be hotter than for tin solder. On an expertly soldered band the solder will surround the individual wires, but there will be very little if any excess on the outside of the band.

Glass Banding

Glass banding* is wonderful, but it has its limitations. First, it should not be used in place of steel wire on certain designs of armatures because the bands not only hold the armature together, they also have decided effects

* Certain arrangements for supporting motor coil end turns utilizing impregnated glass roving are covered by patents 2747118, 2747119 and others assigned to the General Electric Co. No license, express or implied, is extended under such patents by any statement made herein.

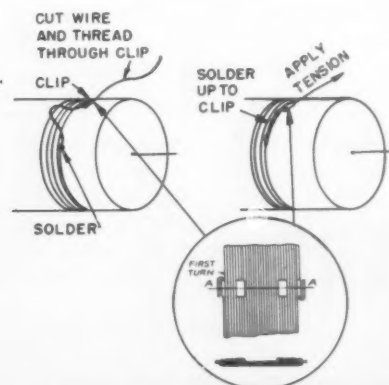


Fig. 4—Method for anchoring steel band wire.

on heat transfer and commutation.

Glass banding generally tends to hold heat in the armature, causing higher operating temperatures. This means shorter winding life because of insulation degradation and greater thermal expansion. Temperature is important on heavily loaded generators and traction motors, especially at the pinion end. That's why wire is normally better for pinion-end bands in very heavy service. If you wish to avoid band failures on the commutator end caused by flashovers, you can use glass. Lower temperatures at that end lessen the importance of heat transfer.

A machine designed for magnetic steel bands may run with glass bands, but it won't commutate well. The sparking will increase brush and commutator wear, and flashovers may be more frequent. Two good rules are: (1) If both core and end bands are magnetic, don't try glass—you'd be replacing too much magnetic material with non-magnetic. (2) If end windings are long compared to core length, glass is likely to give trouble.

As a check, measure over-all length from the back of the riser to the end of the loop. Then measure the core length and divide it by the over-all length. If the result is 0.4 or less, glass bands are apt to cause trouble. If it is 0.6 or more, glass will be satisfactory. Between 0.4 and 0.6 you're taking a chance, and it's best to get the manufacturer's advice. If magnetic bands are required for commutation, but you still want to use glass, consult the manufacturer. He may suggest ways to compensate the machine so it will run acceptably with glass bands.

Don't get caught in the booby trap of replacing the magnetic bands on certain amplitudes, auxiliary generators and exciters. This may make their characteristics so different they won't

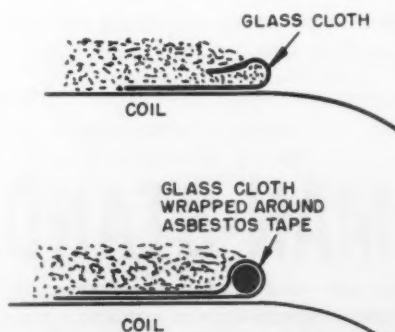


Fig. 5—Ways to confine edges of glass bands.

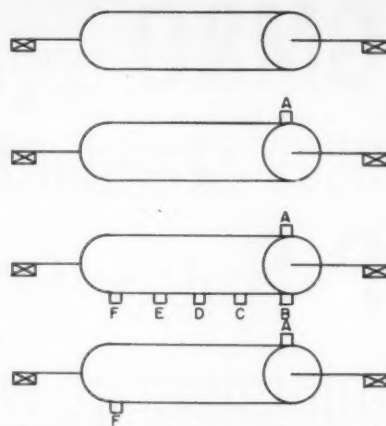


Fig. 6—Differences between static and dynamic balance are illustrated by examples shown above.

do the job they were designed for. The result might be improper excitation for the main generator or wrong locomotive auxiliary voltage. It's best to use magnetic bands unless you get an OK from the original builder.

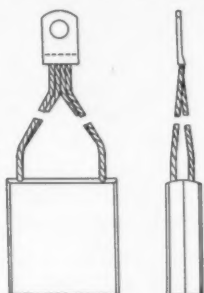
If you decide to use glass bands, do a good job. The most important points are: (1) Go through the usual temporary binding procedure. (2) Use a tension device that gives a continuous indication and holds tension closely. The stationary-pin type won't do. (3) Heat the armature to 125-135 deg C and band while hot. (4) Confine the edges of the band. The extended slot wedges will do this next to the core. At the outer edge of the bands use a temporary dam or a built-in retainer, Fig. 5. (5) Don't try to keep full tension clear to the end of the tape. Let the last turn or two slack off a little after cutting. Then secure the end by pulling it under or ironing it into the preceding turns. (6) Bake the armature to solidify the bands.

Balancing

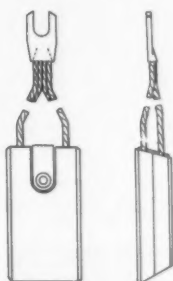
Balancing armatures reduces the vibration in service. This is particularly necessary for modern high-speed motors and generators. If the armature is not balanced, the life of bearings, commutator and windings will probably be very short.

Two types of balancing are commonly used. The simpler, called static balancing is shown in Fig. 6. This shows a cylinder (call it an armature) that is perfectly symmetrical. Such an armature would be in balance. That is, if placed in any angular position it will stay there. Suppose a small weight is added at A. The armature is then

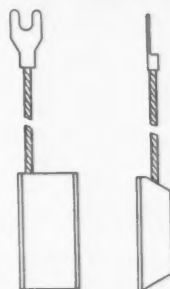
(Continued on page 72)



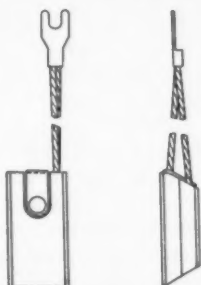
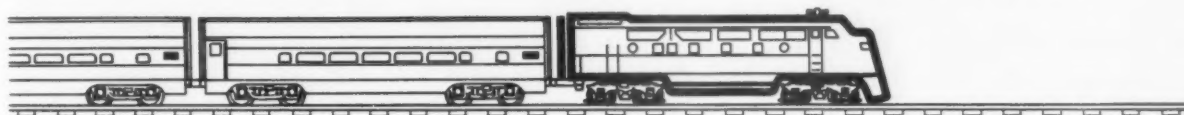
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For EMD, MOT—D7, D17, D27,
D37, 716E2, 721 721A2



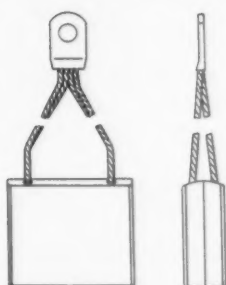
Speer Brush No. 3684-E44
For EMD, GEN.—D12, D15



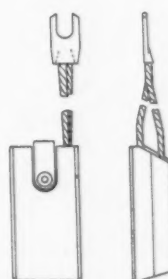
Speer Brush No. 4216-E35
For EMD, AUX GEN —A3001
A7159
BLOWERS—A7158, A7160, A8101



Speer Brush No. 4692-E35
For EMD, AUX GEN —A3001,
A7159, A8102
BLOWERS—A7158, A7160, A8101,
A8103



Speer Brush No. 3602-E34
For GE, MOT —726 730, 752



Speer Brush No. 3717-E24-E44
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unbalanced statically. If placed on frictionless bearings, it will tend to turn so A is on the low side. How can the static balance be restored? Obviously a weight equal to A could be placed at B, C, D, E or F on the opposite side.

Static balance is necessary, but dynamic balance is also required. That is, not only must the armature be balanced when at rest, but also it must not shake when rotating at high speed. Suppose a weight is added at F, Fig.

6, to obtain a static balance. We would then have a condition of dynamic unbalance, even though the armature is in static balance. The dynamic unbalance is caused by a "couple"—that is, at high speed the weight A would tend to throw one end of the armature in one direction while the weight F would tend to throw the other end in the opposite direction. To correct this "couple", weights would have to be added at two different points. That's why, when dynamically

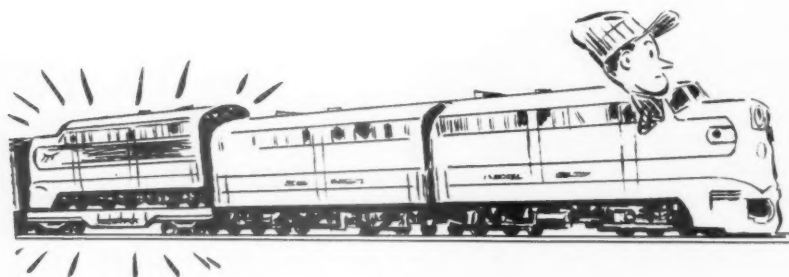
balancing an armature, you "fix" one end and balance the other, then reverse the procedure. See Fig. 6.

Good banding and proper balancing are two important factors in ensuring that the armature will give long, trouble-free operation in service. A little time and care invested here will pay good returns in minimized service breakdowns and costly repairs.

The Answer: Support the beam 13 in. from the pulley end.

From the Diesel Maintainer's Note Book

Along for the Ride



By Gordon Taylor

This case reminds one of a baseball pitcher that has lost much of his power and has no control of the power that is still available. This unit, like the pitcher, was just a drag on the rest of the team. This case occurred on a district where freight diesels had been in use less than a year, and the crews were not fully experienced. It does show how lack of attention to little details can cause delays and also that often the wrong inference is drawn from what one observes in diesel operation.

What happened? A three-unit Alco freight diesel locomotive left its home terminal with the control air pressure cut out on its rear trailing A unit. The train being handled had about half the usual tonnage. Because of the light train, the crew was

not aware of the fact that the rear unit was not operating properly. The fireman in checking back through the locomotive failed to note the lack of control air pressure on the rear unit. The engineer did notice that the locomotive did not seem to have full power, but because it had enough power to handle the train, he proceeded on his way.

At the first division point, the fireman saw the enginehouse foreman and reported that there was low fuel pressure on the leading A unit and on the B unit. The fireman had noticed that the fuel pressure on the rear unit seemed higher than the fuel pressure on the two lead units. Because he failed to check the fuel rack on the trailing A unit, the fireman concluded there was something wrong with the fuel pressure on the two leading units.

With this report and because there was little time, the maintainers did not closely check the trailing A unit. The locomotive was sent on its way

and the new crew in charge failed to discover that there was no control air on the rear unit.

However, on arrival at the next terminal, the fireman reported that the booster air gage was defective on the trailing A unit because it did not register as high as on the other units. As you no doubt know, this gage measures the booster or supercharged air needed in the engine cylinders for proper fuel combustion.

The maintainers at the second engine terminal found nothing wrong with the turbocharger when the locomotive was standing. No one considered what might have caused this air gage to read low.

The locomotive was again dispatched for service with a new crew, but this time the unit, which until now had been trailing, was placed in the lead position. Leaving the terminal yard, the engineer noted that the load meter showed no current going to the traction motors. He simply accepted this as something that made no particular difference. It is difficult to believe, but he failed to discover that the lead unit was not loading because there was no control air. The zero reading of the load meter was certainly a strong indication of this. The crew could not hear the usual noise of power contactors closing when making transition. The lack of experience of the crew is about the only explanation for continuing to operate a unit which was not working. Because this train was heavy enough to require the power of three units, the train lost considerable time in reaching the next division point. It was necessary to double over one hill.

When the third division point was

This series of articles is based on actual experiences of men who operate and maintain diesel-electric locomotives.

reached, the road foreman and an electrician met the train. The electrician quickly discovered the lack of control air. The shut-off valve in the control air supply line was closed, and the drain valve on the control air reservoir was open. When the drain was closed and the valve opened, the locomotive was back in business ready for full duty. The loafer unit was now put to work.

Now a further word of explanation about the report of low booster air pressure on the unit. Without control air, there was no way to operate the power contactors. Therefore, the engine was operating without load. It did not require much fuel to operate an unloaded engine. With little fuel being burned, there was not enough exhaust gas to operate the turbocharger at full capacity.

So the turbocharger failed to provide the booster air that would have been supplied had the engine been working under load. This explains why the fireman failed to understand what was happening on the rear unit and caused him to point an accusing finger at the two lead units.

The lesson to be learned from this case is based on fundamentals:

- Always be certain that control is cut in and providing normal air pressure on each unit in a multiple-unit locomotive.
- Be careful to check each unit to see that it is delivering power before it is dispatched in service.

Now consider that "inoperative" load meter on the lead unit when the locomotive made its return trip. Because the lead unit was not delivering power, there was no damage to its traction motors. But, without the benefit of the load meter, there was no way of knowing how much current was being handled by the traction motors on the two trailing units. Remember that these two units were handling a train that needed the power of three units. Chances are that the traction motors were being subjected to heavy overloads. It is, therefore, important that enginemen have lead units with load meters that are working.

A unit that will not load up and haul its own weight had better be left at its home terminal. There is simply no place for a loafer unit in a freight locomotive. It costs too much to just take it along for the ride. Watch those simple things that cause delay and expense when neglected.

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Supply Trade Notes

(Continued from page 10)

TIMKEN ROLLER BEARING COMPANY.—*D. A. Bessmer* elected president, succeeding *William E. Umstadtd* retired.

LINDE CO., DIVISION OF UNION CARBIDE CORP.—*William S. Winn*, manager, Eastern Region sales, appointed manager of new Oxweld Railroad Department at New York. Other appointments in department are: *R. H. Bennewitz* as manager, railroad sales, and *W. G. Gumm* as manager, railroad engineering, both at Chicago; *C. R. Strutz* and *H. R. Miller* as sales managers, eastern and midwestern zones, respectively.

SERVO CORP. OF AMERICA.—*William P. Morrison* appointed sales manager, Railroad Products Division. Mr. Morrison formerly manager of Railway Service Division of Sperry Products. *William M. Pelino* appointed to newly created position of chief technical advisor, Railroad Products Division.

MAGNAFLUX CORP.—Magnaflux is conducting an intensive training course in nondestructive testing at its Chicago plant. Since January 1, 1959, thirteen five-day sessions have covered the basics, theory and practice of this testing. Each class is limited to eight men, including quality supervisors, inspectors, operators and those responsible for training operators throughout the United States. A student receives individual



D. A. Bessmer
Timken



W. S. Winn
Linde Co.



C. A. McGough
Peerless Tool



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Morrison

attention and a chance to process actual pieces from a library of over 800 typical parts having known defects. Time is divided equally between laboratory inspections, class discussion and lectures with visual aids. The course includes a survey of fundamentals and methods of fabrication used in metalworking and studies the origin of defects in materials and parts. The theory of magnetic particle and fluorescent penetrant inspection is taught. The techniques for creating indications of any defects are covered, also the interpretation as to specific causes of defects and evaluation of parts as to probable service life.

SKF INDUSTRIES, INC.—*Thomas W. Morrison* appointed director of engineering and research. *Edgar K. Lofton*, 700 Cambridge Road, Bala Cynwyd, Pa., appointed manager of railway sales. *John O. Cushing* appointed district manager at Atlanta, Ga.

MUMMERT-DIXON CO., PEERLESS TOOL DIVISION.—The Peerless tool line of the H. K. Porter Co. has been purchased by Mummert-Dixon of Hanover, Pa., who has established the Peerless Tool Division. *Charles A. McGough*, who was manager of Porter's tool plant in Hanover is president of Mummert-Dixon.

MORRISON RAILWAY SUPPLY CORP.—*Floyd Thomas Ridley* named vice-president, sales, development and traffic. Headquarters 814 Rand building Buffalo, N.Y.

ALCO PRODUCTS, INC.—*Hans Schwarz* appointed manager of general engineering and development in research and development department.

SPARTON CORP.—*W. E. McKittrick*, corporate vice-president, named also general manager of new Railway Equipment Division at 17333 Healy ave., Detroit. *Reeves P. Comfort* appointed eastern regional sales manager of division.

Obituary

PAUL R. TURNER, former director of sales of the Electro-Motive Division of General Motors and more recently president of Trailer-Train Corp., died August 24.

Letters

Resetting the PC Switch

TO THE EDITOR:

I have reviewed my article in your June issue and realize what your reader (RL&C, September 1959, p 121) was driving at. The resetting of the PC switch is a term loosely used by numerous men on the various railroads. It so happens that one does not recover the PC, as this is automatically accomplished by a timed blow-down and, to further this question, I have rewritten the paragraph as follows:

"In the event of an emergency application initiated from the train or locomotive, the automatic brake-valve handle must be placed in emergency position until the equalizing reservoir air pressure has been reduced to zero. When the cause of emergency has been corrected, the brake-valve handle must be returned to release position to recharge the brake pipe and regain control of the air-brake equipment"

C. Charles

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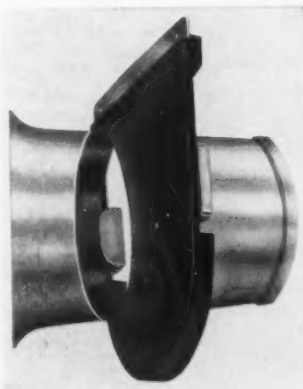
What's New

(Continued from page 18)

Low-Temperature Phosphating Compound

Turcoat Low Temp is a phosphating compound that operates at a temperature as much as 75 deg lower than that required by conventional phosphating processes. When operated at 95 deg F, it provides a paint-gripping zinc phosphate coating on iron, steel or zinc equal to those provided by phosphating processes requiring operating temperatures of up to 180 deg F. When used as a bond for paint, the compound gives a uniformly smooth coating of up to 200 mg per sq ft in 2 min at 95 deg F. When used as a base for corrosion prevention, coatings up to 1,100 mg per sq ft are obtained in 10 to 15 min. at 95 deg. F.

The compound can be applied by immersion or spray washer. It is said to effect savings of approximately 75 per cent in steam, water electricity and "down-time" costs. *Turco Products, Inc., Dept. RLC, 24600 South Main st., Wilmington, Calif.*



Journal Stop and Rear Journal-Box Seal

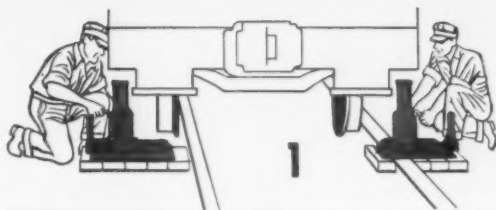
This device consists of a rear journal-box seal which fits into the dust-guard slot, together with two replaceable bronze journal stops. The seal is especially designed to maintain its position on the dust guard seat at all times, keeping oil in the box and dirt and moisture out. The journal stops are replaceable bronze blocks designed to stay in contact with the dust-guard seat. They reduce shock and add life to truck components; protect the oil seal, and help to increase life of the journal bearings.

The device is simple to apply. No alterations to standard journal boxes are needed. *Canadian Bronze Co., Dept. RLC, 999 De-lorimer ave., Montreal 24, Canada.*

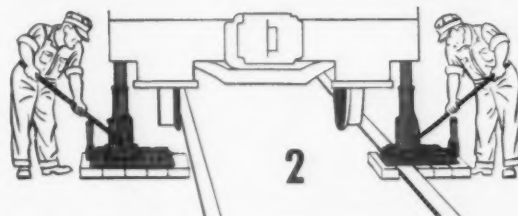
Overload Cutoff Unit For Electric Hoists

Fast-acting mechanical overload protection for the operator, load and hoist itself is an

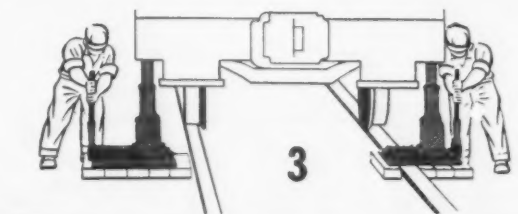
How to get back on the track quickly Without A Crane!



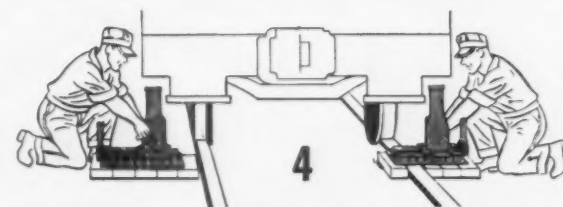
Place a Duff-Norton traversing base and jack beside each derailed truck.



Jack up the car or locomotive until wheels clear top of rails.

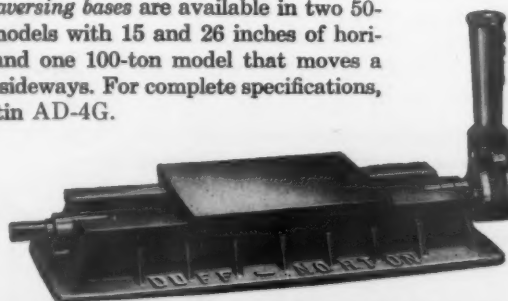


Move jacks horizontally simultaneously on traversing bases until wheels are in alignment with rails.



Lower wheels; you are back on the track, quickly, inexpensively and without danger of distorting car or locomotive frame.

Duff-Norton traversing bases are available in two 50-ton capacity models with 15 and 26 inches of horizontal travel and one 100-ton model that moves a load 20 inches sideways. For complete specifications, write for bulletin AD-4G.



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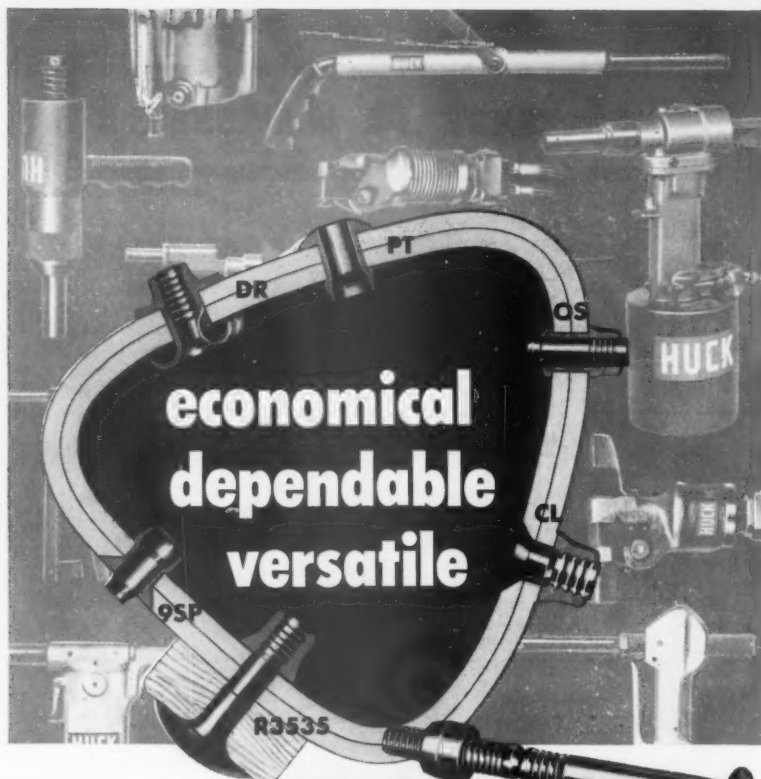
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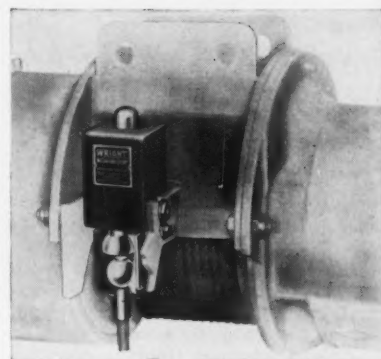
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blind fastener.

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broad bearing.

OS
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blind fastener.

R3535
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integral part of the frames of Wright Speedway electric hoists. At the critical point of overload, the cutoff unit instantaneously "breaks" the raising circuit of the hoist, allowing the load to be safely lowered to the floor and unhooked. The raising circuit is then automatically restored.

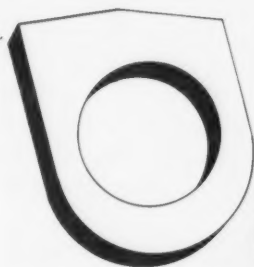
The Overload Cutoff is available as standard equipment on all new Frame 2 and 3 Speedway electric hoists and as optional equipment on Frame 1 and 1½ models. American Chain & Cable Co., Dept. RLC, 929 Connecticut ave., Bridgeport 2, Conn.



Automatic Air Transformer

The new Spee-Flo automatic air transformer, a dual purpose moisture extractor, provides a full supply of clean, dry air at the main line and a precisely regulated pressure. It is completely automatic; it starts when the air flow starts, stops when the air flow stops, and no manual drainage is necessary. An automatic water separator automatically removes and dumps 100 per cent of the moisture present in air lines in normal operation. An air regulator insures constant, accurate control of air to equipment. Self-relieving, the balanced valve design reduces internal pressure drop and provides a positive air-flow rate. The transformer is available in three models. It may be had as a water separator only, or with one or two regulators. Spee-Flo Co., Dept. RLC, 6614 Harrisburg Blvd., Houston 11, Texas.

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- C. Car Reamer (Straight Flute)

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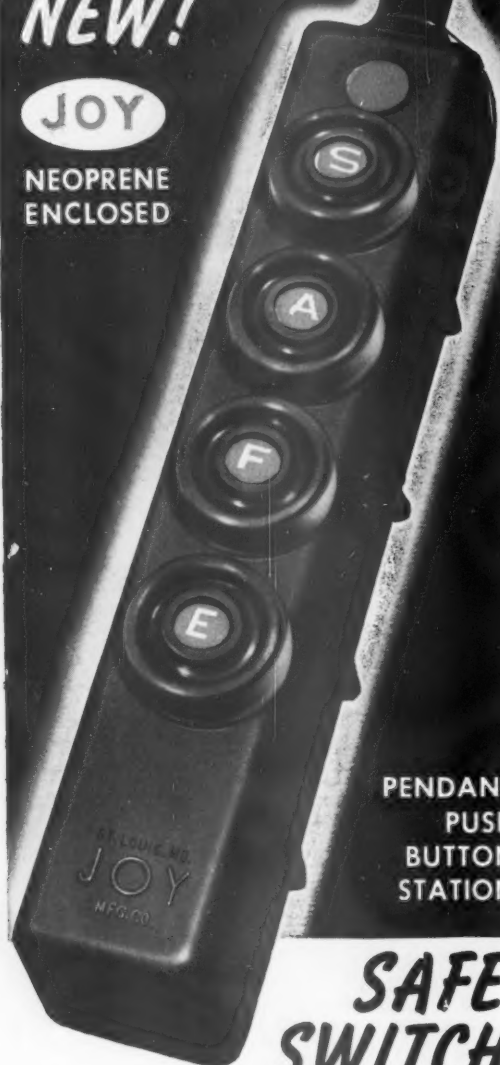
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